

BROOKLYN BOTANICAL GARDEN

PLANTS
&
GARDENS

THE BROOKLYN BOTANICAL GARDEN, 100 JEROME AVENUE, BROOKLYN, N.Y. 11205



GARDENING GUIDE

- Planning a Flower Garden
- The Best Perennials & Bulbs
- Containers & Hanging Baskets
for Patio & Terrace
- Vegetable & Fruit Gardens
- Lawn Care
- How to Plant & Prune
Trees & Shrubs



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BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

GARDENING GUIDE

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*Herman Gantner
Paul F. Frese*



Above: One planting arrangement for tulips is to set the bulbs in loose circles of five to six bulbs—each circle containing the same variety. This method is especially practical as well as attractive in gardens containing perennials where space for long drifts or massed effects may be lacking. **Below:** Here tulips have been planted in drifts or borders, a method that works well in the foreground of shrub groupings.

LETTER FROM THE BROOKLYN BOTANIC GARDEN

Seventeen years have passed since the last Brooklyn Botanic Garden primer on this subject, and the time is ripe for a new look. Things have changed, and so has the way we regard the environment. There are many more small gardens around the country, more all-green ones, more plots of land cultivated in cities. An increasing number of people have discovered container-growing for the first time. More of us than ever are raising fruits and vegetables. New gadgetry, gimmicky tools and various "miracle" plants come—and most of them go. We aren't concerned with them as much as with the essentials of gardening, as presented in the following pages.

Gardens may be simple or complicated. Some of the best ones have but a few kinds of plants. Some of the saddest are overextended ones where spring aspirations were greater than summer capabilities—or inclinations. Fortunately, the size of a garden is immaterial to most of us. It's the quiet, gentle privilege of tending natural living things that counts most, and will probably count for even more as technological society becomes increasingly complex.

Thomas Jefferson's philosophy of gardening has been cited a few times in BBG Handbooks. At the risk of repetition, let us mention several sentences he included in a letter to Charles W. Peale (1811): "No occupation is so delightful to me as the culture of the earth, and no culture comparable to that of the garden. Such a variety of subjects, some one always coming to perfection, the failure of one thing repaired by the success of another, and instead of one harvest a continued one through the year. Under a total want of demand except for our family table, I am still devoted to the garden. Though an old man, I am but a young gardener." Mr. Jefferson, you would be happy at the state of horticulture in America today because there has been a great resurgence of young gardeners (regardless of age).

To help these new tillers the Botanic Garden has turned to Mr. Paul Frese, a seasoned brown-thumb veteran who was gardening before most of us were knee-high to a portulaca. Do not look for pleasant abstractions in this Handbook—these will come to you while your mind is at peace (and body at work) in the garden. The task of Mr. Frese and his nineteen fellow contributors is to give us the down-to-earth information we need to know to get started. Thank you, kind authors, for bringing us up-to-date.

Whatever your first gardening indiscretions may be—the tomatoes that flop in the shade, the neon-magenta petunias next to and behind the fire-engine-red salvia, or the undivided phalanx of bee-balm that is marching to Georgia (though you live in Oregon), tromping down treasured delphiniums and routing even the robust rudbeckias—don't be discouraged at all. As experience grows, gardening's personal pleasures, as well as the sharing of rewards with family and friends, will increase. And that's what it is all about.

Sincerely,

Frederick Mc Gourty, Jr.
Editor

*How to plan a peaceful, distinctive garden
—without too much work*

BEFORE YOU BEGIN

Alfred C. Hottes

THE poorest way of landscaping the home grounds is to look through a nursery catalog without a plan in mind and then blindly choose plants without knowing how many the place will accommodate.

The usual home gardener becomes a hopeless inebriate when he visits a nursery or scans a catalog. It is common practice for persons to plant everything the neighbors will give them; and some believe that as long as there is a square foot of soil not covered by some form of vegetation, there is still room for a giant forest tree.

It is only the extremely abstemious home buyer who can resist planting an apple, a pear, a plum, a peach, and a grape vine in his back yard, for they all look so innocent when young. If they all grow, the result is usually a hopeless hodgepodge of insect-ridden plants, for it would take a very experienced gardener to spray them all properly and keep them in healthy condition. Planting too many fruit trees eliminates the possibility of having any choice flowering annuals, perennials, or shrubs; and the planting becomes so unsatisfactory that the gardener soon loses his interest in gardening. He would be overworked if he took proper care of all his fruits, and dissatisfied with the disorder if he neglected them.

A weed is a plant out of place. Any plant put into the ground and not placed properly is a weed, even though it is a fifty-dollar magnolia tree put into the usual dollar hole. Most people bring home new plants after every foray upon their friends' gardens; then they begin to wonder where to put this loot.

If the garden needs six plants of one kind, do not buy thirty others for which

there is no place. Staggering figures could be compiled on the money wasted in unwise planting every year.

Make a Plan Before Planting

Have an idea in mind. Do not dash around the yard planting hit and miss as if the shrubs and trees were dropped from an airplane. Keep the new trees and shrubs in a wheelbarrow until the place for each one is evident, to complete a carefully thought-out picture. The plants are much easier to move in the wheelbarrow than when they are well rooted in the ground.

Make One Picture at a Time

Do first things first. Set off the doorways with appropriate plants. Hide unsightly views. Enhance beautiful vistas.

Remember that Plants Grow

Everyone expects and wants plants to grow, yet few persons visualize the final effect. The average person shops for bargains, purchasing young trees to plant in front of the house; and when these grow rapidly into forest-size trees, the buyer is disappointed and complains to the nurseryman that his place has become a hopeless jungle. Some persons consider it a bargain to buy an inexpensive vine and plant it where it will hide good architecture.

Enclosure and Spaciousness

Plant the lot so the garden is part of the house, with rooms, windows and space. Begin the planting at the margins of the property, to achieve enclosure for peace and quiet; but do this adroitly so there is no feeling of being smothered by the walls. If the lot has no view, make one. From the principal windows or doors

Fragrance—as well as all-summer color—was the aim for this grouping of flowering tobacco, scented-leaved geraniums and sweet-alyssum, used as an edging.



George Taloumis

make a path leading to a garden feature—a pool, a picturesque tree.

Pleasing Forms and Lines

Flat surfaces give a feeling of peace but they may become monotonous; undulating lines give rhythm to the landscape.

The perfect globe form to which some shrubs are pruned is a disturbing element in the landscape. A pyramid is the most exalting form; but a series of pyramids reminds one of a coarse-toothed saw. It is like the forbidding wall with bits of broken bottles stuck into the concrete; yet many persons are insensitive to this and plant the foundations of their homes with a serried row of pyramidal conifers. It is true, however, that attractive groupings of three or five clustered pyramids can be made to give the effect of one.

Make the Planting Interesting

How to achieve an interesting garden is in each person's hands as an artist or an innovator. A surprise of some sort makes a planting more interesting; but do not litter the yard with rows of strange rocks, toy ducks and windmills. The garden should be peaceful and should not be filled with objects that do not belong there.

Plan to Avoid Too Much Work

Attempting too much always brings dis-

appointment. It is better to have a patio planned with charm than a thousand-acre estate that is a wilderness of weedy beds and disheveled lawns.

Shrubs and trees take the minimum of care—water, an occasional feeding, an all-purpose spraying when required, and a little snipping now and then.

Annuals are much more work; they need to be sown from seed; they are inclined to be crowded by weeds and soon they must be replanted to avoid a yawning gap in the landscape.

Make the Planting Distinctive

Gardens cannot be all alike, for some people like lilacs while others prefer azaleas. One likes formality and preciseness, another likes the winsome ways of nature. Someone is provoked if he hasn't masses of color at all seasons of the year; he is, therefore, delighted with zinnias, while someone else is happy only if he is trying to grow a rare species of rock plant. No, gardens will never be sold by the gross. People are not alike.

Study the Plants

One who wishes to do good planting must know the plants and their habits. An interest in plants is an abiding one. Don't lose heart at the number of trees and shrubs in the nurseries. ❀

GUIDE TO THE USE OF ANNUALS, PERENNIALS, BULBS

Victor H. Ries

THE desire for color in the garden is most easily satisfied by the liberal use of annuals, perennials and bulbs. All three classes of plants have their place, because each has its value as to season of bloom, height or mass of color.

Succession of bloom from early spring to late fall is the goal of nearly every gardener. To achieve this consider first that very few hardy flowers have an individual blooming period of more than two or three weeks. Even annuals bloom only during the summer. Therefore, even for a small garden, one may have to select several dozen different kinds of plants to assure bloom from spring to killing frost.

Your climate will determine how early in the spring and how late in the fall you can have flowers. An added factor is the location of your garden. Low spots in valleys often suffer more from frosts than those at slightly higher elevation, or on hillsides. This is usually due to lack of air drainage to carry the cold air away. Those near large bodies of water, such as lakes and the ocean, may have a later spring but a longer growing season in the fall than those but a few miles away.

Very hot summer climates, especially where the nights are hot, limit the kinds of flowers that may be grown. This applies to hardy flowers as well as annuals. Basic to all successful gardening is good soil and good soil preparation. For guidance on this, turn to page 61.

Planning the Flower Garden

The skillful gardener employs numerous devices to achieve a colorful flower bed or border. For example, by planting spring flowering bulbs between and beneath other flowers, each square foot

of ground should give at least two crops of bloom. Conversely, after spring bulbs, such as daffodils and tulips, are through blooming, they may be interplanted with annuals for summer bloom. As summer blooming annuals go by in September, they can be followed by chrysanthemum clumps transplanted from another part of the garden. An orderly plan, made in advance, will simplify the task of keeping the show going from season to season.

The kinds of flowers you grow will be determined in a measure by the amount of sunlight available. This will vary from bed to bed, from one side of the house to the other. Most flowers will thrive in full sun but a few require shade. Others are shade tolerant, though doing better with a greater amount of sunlight. So it is possible to have flowers in the shade of trees, shrubs and buildings even where no direct sunlight reaches. Such plants as ferns, many wild flowers, and begonias have to be protected from the summer sun, for otherwise they may sun-scorch.

When making a plan, it is important to know how tall each kind of flower grows so as not to plant tall growing ones in front of low ones. The habit of growth should be known too, so as not to crowd massive clumps like peonies next to smaller, weaker growers such as peach-leaf bellflower; or sprawling coreopsis next to a low, tufted Japanese primrose. Very rank growers like the plume-poppy and spreading Chinese lantern are really best kept out of beds with other flowers altogether.

Much has been said and written about planning color schemes in the garden. They are fascinating to think about, but often difficult to work out. Do not be disconcerted if the results are not as ex-

Annuals for Partial Shade

Candytuft	Larkspur	Petunia
Clarkia	Lupine	Tasselflower
Cornflower	Nicotiana	Sweet-alyssum
Godetia	Pansy	Verbena

Low-Growing Annuals

Ageratum, dwarf	Marigold, dwarf	Portulaca
Calliopsis, dwarf	Nasturtium	Sanvitalia
Candytuft	Pansy	Snapdragon, dwarf
Flax	Petunia	Sweet-alyssum
Gypsophila	Phlox	Verbena
Lobelia		Zinnia, dwarf

Annuals Difficult to Transplant—

Best Sown Where They Are to Bloom or in Peat Pots

California-poppy	Larkspur	Portulaca
Evening stock	Love-in-a-mist	Scarlet runner bean
Godetia	Lupine	Sweet pea
Gypsophila	Mignonette	Tree-mallow (<i>Lavatera</i>)
Laceflower	Nasturtium	Virginia-stock
	Poppy, Shirley	

Annual Vines for Shade and Privacy

Cardinal Climber	Hyacinth bean	Scarlet runner bean
Cypress-vine	Moonflower	(edible)
Gourds	Morning-glory	

Annuals With Long Season of Bloom

Ageratum	Impatiens	Sweet-alyssum
Begonia, Wax	Marigold	Thrift
Browallia	Nicotiana	Verbena
Calendula (if summer is cool)	Petunia	Vinea
Gaillardia	Snapdragon	Zinnia
	Spiderflower	

May Be Fall-sown or They May Self-sow

Ageratum	Four-o'clock	Portulaca
Amaranthus	Larkspur	<i>Salvia farinacea</i>
Balsam	Mentzelia	Snapdragon
Browallia	Morning-glory	Snow-on-the-mountain
Calendula	Nicotiana	Spiderflower
California-poppy	Nigella	Summer-cypress
Calliopsis	Perilla	Sunflower
Cornflower	Petunia, small-flowered	Sweet-alyssum
Cosmos	Poppy	Wild cucumber

Annuals with Fragrant Flowers

Ageratum	Pansy	Sweet-alyssum
Evening stock	Phlox	Sweet peas
Heliotrope	Pinks	Sweet sultan
Mignonette	Seabiosa	Verbena
Nasturtium	Stock	Virginia-stock
<i>Nicotiana affinis</i>		



Roche

The petunia is one of the leading annuals for abundant color in boxes and borders.

pected. Flowers have an irritating way of not blooming just when they should, so that carefully planned combinations may not materialize. Colors vary too. Blues in catalogs are not always your idea of blue. This goes for lavender, purple, red, pink, orange, yellow and so on through the rainbow. In any case, there is enough green foliage to subdue impossible color combinations.

Some people like to have their flowers in the front of the house where they can be seen. Others prefer to enjoy them in privacy. It is well to remember that in early spring and fall the weather may not be conducive to outdoor enjoyment. Plant so that cold weather bloom may be enjoyed from the warmth and comfort of the home, using the windows as a means of access to the garden. Flowers can also be planted so as to be seen from the patio or terrace area. In every instance, a garden with a pleasing pattern or design and an adequate background is more satisfying than one without.

Annual flowers are a great source of summer and early fall color. Most of them are easy to grow from seed, and are not expensive when purchased as plants. They all bloom the first season or they could not be called annuals. A number will self-sow and come up year after year. No other type of flower gives so much bloom for so long a period during hot summer months.

Some annuals must be started early to bloom by early summer, such as vinca, verbenas, *hunnemannia*, *lobelia*, scarlet sage. A few do not bloom until later in the summer no matter how early they are started, such as *China-aster* and *cosmos*. A few will not bloom during very hot weather, notably *calendula*, *stocks*, *salpiglossis*, *nemesia* and *nemophila*.

There is a tendency on the part of many gardeners to set out annuals too early in the spring. Except for those that are called hardy, better wait until all danger of frost is past. Even if there is no frost, cold weather will stunt the seedlings.

Growing your own plants indoors will result in weak, spindly seedlings because of high temperatures and lack of sunlight —unless you have very sunny windows (fairly common with today's modern architecture) or can grow the seedlings under fluorescent lights. Either way, the young plants will need gradual exposure to outdoor temperatures before they are finally put in the garden. Along with fluorescent lights are other boons for indoor sowing of annuals, including various kinds of soilless mixes that are light and clean to handle and do not need sterilizing. Perhaps the greatest boon of all is the peat pot or peat pellet: plant and peat pot or pellet are planted directly in the garden.

Combining Bulbs with Perennials

Many gardeners strive to have a garden that is bright with flowers from spring to fall, but very few ever succeed in making such a garden. Part of the reason for this is lack of space to grow enough plants to put on a real show. More often, not

enough thought has gone into selecting plants which will provide an uninterrupted flow of bloom.

In many instances, one could use no more than seven or eight kinds of hardy flowers, such as daffodils, tulips, iris, peonies, phlox, day-lilies, hardy asters and chrysanthemums, and then, by selecting

varieties within each group which flower at different times, have seven months of bloom from them alone.

As a basic guide, the following list is offered. Included are hardy and tender bulbs, perennials, annuals and even a few native plants suitable for growing in gardens. ❀

FIRST FLOWERS OF SPRING

Crocus, especially *C. susianus*, *tomasinianus*, *sieberi*

Daffodils, as 'February Gold', 'March Sunshine'

Lenten-rose
Snowdrop
Winter-aconite

EARLY SPRING

Crocus
Daffodils (mid-season)
Grape-hyacinths
Glory-of-the-snow
Hardy candytuft

Hyacinth
Lungwort
Mertensia
Pasque-flower
Primrose

Rockcress, both *Arabis* and *Aubrieta*
Tulips (early, double early and Kaufmanniana hybrids)

LATE SPRING

Bleeding-heart
Columbine
Daffodils (late variety)
Day-lilies, lemon, *dumortieri*, *middendorfi*, etc.

Iris
Japanese primrose
Leopardbane
Meadow-rue
Squills

Sweet rocket
Painted daisy
Peony
Tulip (May-flowering, double late)

EARLY SUMMER

Anchusa
Balloon-flower
Coreopsis
Day-lilies
Delphinium

Foxglove
Gaillardia
Gas-plant
Hollyhock

Lilies, Olympic and Mid-century hybrids;
Madonna
Peachleaf bellflower
Phlox 'Miss Lingard'
Shasta daisy

MID-SUMMER

Butterfly weed
Cardinal-flower
Day-lilies

Evening-primrose
Flowering spurge
Lilies (later hybrids)

Stokes-aster
Most annuals, as marigolds, zinnias, petunias

LATE SUMMER

Cardinal-flower
Chrysanthemums (early varieties and cushions)
False dragonhead, 'Vivid'

Joe-pye-weed
Lilies (Henry, *speciosum*, *formosanum*)
Pink turtlehead
Plaintain-lilies

Showy stonecrop
Annuals, including china-asters, cosmos, castor bean, *hunnemannia*

EARLY AUTUMN

Chrysanthemum
Closed gentian
Hardy asters
Hardy begonia

Japanese anemone
Lily, *formosanum*
Monkshood
Plumbago
Purple coneflower

Salvia azurea
Most annuals until frost
Gladiolus, late June planted
Dahlias until frost

LATE AUTUMN

Aster tataricus
Coreopsis

Gaillardia
Wilson monkshood

Annuals, as sweet-alyssum, petunias, calendula, nasturtium, snapdragons

IMPATIENS

Robert J. Armstrong

IMPATIENS has been a favorite of gardeners for years. In recent times many new kinds and varieties have become available, making it one of the most popular of summer bedding plants.

Flowering-balsam (*Impatiens balsamina*), an old favorite, has now been improved to overcome the drawback of flowers being hidden among the leaves. New varieties such as the dwarf bush types have double flowers which occur well above the foliage. Strains are available in a wide range of colors, but usually are sold as a mixture. A good well-drained soil in a warm sunny location with a steady supply of water is required. Plants will not tolerate a wet, cold and shady situation. Seed may be germinated at 70° F. and the seedlings grown in a warm, sunny greenhouse or window until the danger of frost is over in the garden.

Sultan (*Impatiens wallerana*; synonym, *I. sultanii*) is the most popular impatiens available today, and is what is envisioned when the word "impatiens" is mentioned. It is particularly well adapted to shady flower beds. No other plant rivals this group in the show of color and ease of culture under these conditions.

Varieties range widely in habit. The older varieties were rather tall and strongly upright. The newer F₁ strains are more vigorous, more compact, flower more profusely and generally make a much superior bedding plant. The most popular hybrids seem to be the Elfin F₁ series (8-10 inches) which are available in a wide range of colors, and the Imp F₁ series which are dwarf plants, early and very free flowering. Some of the strains perform rather well as hanging-basket subjects. Several strains are available with bicolor or variegated flowers.

The culture of sultana impatiens is

easy. A garden loam of moderate fertility is adequate for good growth and bloom. A steady supply of moisture and good drainage is essential for successful culture of sultanas. They do well in shady areas and actually perform best with some shade, as opposed to full sun for the entire day. Plants are easily started from seed, which is best sown at 70° but germination tends to be erratic over a long period of time. The F₁ strains seem to germinate better and more evenly than the old lines.

Sultanas may be propagated from cuttings, which are easily rooted in a sterile medium or in water (preferably distilled). With cuttings, care must be taken so plants do not wilt. The most popular strains of sultanas are available as plants or seed from nearly any garden center during spring and early summer.

Of late, a new type of impatiens has begun to appear on the scene. These are the new hybrids derived from the recently introduced New Guinea and other Indonesian impatiens. These plants are available in a range of colors and foliage types which have not previously existed in the genus. Those with variegated foliage rival coleus and crotons in foliar display.

The New Guinea hybrids are much more robust and have much larger, more brilliantly colored flowers than the sultanas. Flower size can range up to 2½ to 3 inches in diameter, with colors ranging from pure white to deep crimson including lavender and orange.

The range of foliage color is nearly as wide as that of the flowers. Entirely colored leaves range from chartreuse to deep burgundy red. Variegated leaves occur in rainbow patterns as well as the familiar green and white combinations. The variegated forms are very attractive as foliage plants with or without flowers.

The habit of the New Guinea hybrids also covers a wide range; the newest cultivars are also somewhat more resistant to heat and therefore bloom well the entire summer and autumn until frost.

The culture of these hybrids is somewhat different from the sultanas. They require abundant sunlight and a well-drained soil with plenty of water and fertilizer. Relatively high fertility levels are most important in the development of a healthy compact plant with a large number of flowers.

Propagation of the New Guinea types is exclusively by cuttings with one or two possible exceptions. Cuttings root in a short time in just about any medium, care being taken to prevent them from wilting. The home gardener can easily root cuttings in water, preferably distilled.

In borders or beds which receive sun for all or a major portion of the day, the New Guinea hybrids will do well, espec-

ially if temperatures do not go over 90°. Areas receiving shade much of the day would be favorable to the sultanas or some other shade-loving plants.

As house plants, the sultanas are the preferred candidate, but the New Guinea hybrids can be maintained in a sunny window during the winter and then propagated and/or planted outside the following spring. However, the New Guinea hybrids will put on a spectacular display during the winter months for gardeners having a warm greenhouse. Night temperatures of 60-65° are best.

The major pest of impatiens seems to be mites, which are especially severe on the New Guinea hybrids. This is not too much of a problem when they are grown outside under high humidity but can become critical in a house or greenhouse. Frequent syringing with water will help prevent build-ups. Miticides may be used according to directions. ♣

Plants That Attract Hummingbirds

IT is truly a joy to see a hummingbird skipping from flower to flower to obtain nectar. Only certain flowers will attract these beautiful iridescent birds. The following is a list of perennials which should bring hummingbirds to your garden:

Bee Balm	<i>Monarda didyma</i>	sun or shade
Beard-tongue	<i>Penstemon</i>	sun
Butterfly-bush	<i>Buddleia davidii</i>	sun
Butterfly-weed	<i>Asclepias tuberosa</i>	sun
Catmint	<i>Nepeta</i> × <i>faassenii</i>	sun
Columbine	<i>Aquilegia hybrids</i>	sun or light shade
Fragrant Hosta	<i>Hosta plantaginea</i>	light shade—shade
Honeysuckle vine	<i>Lonicera japonica</i>	sun—light shade
Lavender	<i>Lavandula officinalis</i>	sun
Live-forever	<i>Sedum spectabile</i> and <i>telephium</i>	sun
Purple Sage	<i>Salvia pratensis</i>	sun
Hybrid Sage	<i>Salvia</i> × <i>superba</i>	sun
Summer Phlox	<i>Phlox paniculata</i>	sun or light shade
Sweet William	<i>Dianthus barbatus</i>	sun
Trumpet Vine	<i>Campsis radicans</i>	sun to light shade

—Andre Viette

*Today more than ever, perennial plants
are being appreciated by America's gardeners*

A PLACE FOR PERENNIALS

Andre Viette

IN our hectic and fast-moving world people are looking for low-maintenance gardens and many perennials are fitting beautifully into their requirements. A common saying is "you don't have to replant them every year." In the past perennials have found their greatest use in flower borders. They have been employed in combination with spring, summer and autumn bulbs. Annuals also have complemented them as companion plants. Many possibilities exist with the wide variety of perennials which are available.

A garden can be planted for continuous bloom throughout the year, including the winter months, or maximum color can be had at a particular season when that area of the property will be getting its greatest use. In other words, it might be best to have perennial plants bloom over a two-month period at the poolside or summer vacation home rather than having plants bloom in early spring or late autumn when no one is there to enjoy them—or take care of them.

There are perennials which can be planted for color along streams and around ponds and pools. Gardens can also be designed in front of evergreens to provide a complete season of bloom (the evergreens provide the greenery in winter). Do not overlook the use of low-maintenance perennials as colorful ground covers. Most of the flowering shrubs and evergreens bloom in the spring, but the main use of the garden by the average family is as an entertainment center during the summer. This is where the varied and valuable perennials prove their importance.

After the spring bulbs give their beauty, we are almost always left with their dead and shriveling foliage. By prop-

er selection of perennial plants we can design a garden which will have the perennial foliage hiding the unsightly foliage of the bulbs.

Many garden sites have both sun and shade areas. This is further complicated by the existence of varying degrees of shade. The large group of perennials, actually numbering into the thousands, is so versatile that we can select plants that will thrive in each of the exposures and some that will grow in both sun and shade. This is especially important when a garden is designed with the understanding that some of the small trees and shrubs are going to grow and provide more shade in the future. Whatever the preference—a bold garden with oranges, reds and other brilliant colors or a pastel one with pale blues, pinks, light yellows and white, there are perennials that will fit the need.

How to Do It

We must approach the perennial border with the idea of providing one soil and situation which will benefit most of the plants to be grown. It is too difficult and time-consuming to prepare a separate soil for each different kind of plant in the garden.

There are many products at our disposal for soil preparation. We have both liquid and granular fertilizers, organic and inorganic fertilizers, time-release and instant-release types, natural organic and man-made organics. The important factor is that the plants have their minimum requirements of the various nutrients fulfilled. We must be careful not to force succulent and soft growth in autumn with excessive applications of high nitrogen fertilizers. This causes plants to be more subject to disease and



George Talounis

Perennials provide striking differences in plant habit, foliage and flower form—differences well displayed in this garden of yarrow, delphinium, lilies, astilbe and many others.

winter injury. Since phosphorous moves slowly in the soil it should be incorporated into the soil at the time of planting. Superphosphate and bone meal are excellent materials for this purpose. (Bone meal releases its phosphorous more slowly.)

Organic matter is important in soil structure. Peat moss, leafmold, compost, animal manure and seaweeds are just a few of the materials available to incorporate organic matter into the soil.

Most perennials grow best in a soil with a pH of between 6 and 7. A soil test will indicate if lime is needed. Gypsum has proven to be a good soil conditioner in heavy, wet or clayey soils.

With some exceptions, perennial plants may be moved at any time of the year—during bud initiation, bud development, flowering, or post-flowering period. Of course, perennials in pots or containers

can be planted throughout the growing season without fear of root disturbance. However, the best time to divide perennials varies from one plant to another. Early spring and early autumn are the safest periods for the propagation of most perennials by division.

Watering is the most important part of culture in a flower garden. Watering lightly every day results in surface rooting and winter damage could result. Overwatering often causes physiological damage to the roots and creates conditions favorable to root rot and other disease organisms. The best way to water is deeply and thoroughly, providing 1 to 2 inches of water every seven days to two weeks, depending on weather conditions and soil type. This practice promotes deep rooting and discourages disease. In other words, water wet-to-dry, not wet-



Paul F. Freese

Long-Blooming Perennials

(Improved varieties
often available)

Length of Bloom

<i>Achillea filipendulina</i>	60-100 days
<i>Armeria maritima</i>	90-120 days
<i>Campanula carpatica</i>	60-90 days
<i>Chrysogonum virginianum</i>	140-160 days
<i>Coreopsis hybrids</i>	60-120 days
<i>Corydalis lutea</i>	110-130 days
<i>Dicentra eximia</i>	130-160 days
<i>Echinacea (Rudbeckia) purpurea</i>	50-70 days
<i>Geranium sanguineum</i>	
'Prostratum' (<i>lancastricense</i>)	60-90 days
<i>Heliopsis hybrids</i>	90-100 days
<i>Hemerocallis</i>	30-60 days
<i>Liriope</i>	30-45 days
<i>Lysimachia clethroides</i>	60-90 days
<i>Lythrum salicaria</i>	60-90 days
<i>Monarda didyma</i>	45-60 days
<i>Nepeta</i> × <i>faassenii</i> (<i>mussinii</i>)	60-90 days
<i>Phlox paniculata</i>	75-85 days
<i>Rudbeckia fulgida</i> 'Goldsturm'	60-90 days
<i>Salvia</i> × <i>superba</i> (<i>nemorosa</i>)	90-120 days
<i>Sedum spurium</i>	60-90 days
<i>Tradescantia virginiana</i>	120-160 days

Few perennials can rival the day-lily for durability and usefulness. It will grow in full sun or partial shade and withstands periods of drought. It is resistant to most pests and remains in good blooming condition for years before dividing is necessary.



'Geraldine Deans' day-lily photo by Andre Viette

Day-lily cultivars are now available in melon, pinkish and lavender colors as well as the familiar yellow and orange tones. Most day-lily flowers are fragrant, some exceptionally so.

to-wet.

Mulches benefit many perennial gardens by preventing erosion, conserving moisture and controlling weeds. We must, however, be careful not to bury too deeply the crowns of certain perennials such as delphinium and iris. A good mulch must fill the following requirements:

1. It must allow most of the water to pass through it, absorbing very little.
2. It must act only as a mulch, not as a soil medium, and be coarse enough to inhibit root growth in it. Once a mulch allows root growth to form in it, the material is no longer a mulch and becomes really part of the soil medium, raising the surface level of the bed.
3. It must have no toxic or excessive fertilizer qualities.

Many mulches fulfill these three re-

quirements, *e.g.*, oak leaves, non-toxic seed hulls of many types, coarsely ground corn cobs, wood chips, bark chips, sugar cane, salt hay and even gravel. Peat moss is a poor mulch which, when dry, becomes impermeable and is also a fire hazard. If kept constantly moist it promotes surface rooting. It should instead be freely mixed in the soil. Sawdust can cause a nitrogen deficiency which must be compensated for by the proper fertilizer application high in nitrogen.

The best soil preparation is accomplished simply by applying the necessary complete fertilizer, organic matter, lime and gypsum (if needed), and phosphorous. This material should be forked in deeply and thoroughly. Each spring a long-lasting fertilizer and lime (if necessary) are applied to the soil.

The Most Popular Perennials

The hemerocallis, or day-lily, is considered by many to be the perfect perennial. Certainly, few plants can rival it for garden durability and usefulness. Day-lilies are very adaptable and will thrive in full sun or light shade, in wet or dry locations, in heavy or light soil, and they require little care. A wide range of heights is available from 12 inches for the foreground to 4 feet for background plantings.

Day-lilies provide a much longer blooming season than most other plants. By the careful choice of varieties, we can expect flowers from May through October, with the majority of cultivars reaching peak bloom in midsummer. The average cultivar blooms 3-6 weeks. There are many varieties in different colors from which to choose. The main shades are red, maroon, orange, yellow, gold, melon, pink, peach, lavender and rose. Day-lilies are not only being used widely in the perennial garden but also are being used more and more in mass plantings for naturalistic effects in meadows, open woodlands, along roadsides and as a ground cover, especially on banks and slopes.

The Color Range of Day-Lilies

The diversity of color in current day-lilies is a far cry from the limited selection of less than twenty-five years ago. The cultivars that follow are a representative selection from thousands now in cultivation. Listed in the catalogs of day-lily specialists, they are in a price range everyone can afford.

Yellow

'Hortensia'. Medium yellow. Big, round plate-like blooms. Ruffled petals.

'Star Dream'. Medium yellow. Produces many flowers over a long season. Very fragrant.

Orange Tones

'Aten'. Glistening clear orange, midseason.

'Cartwheels'. Large, very wide open flowers, golden orange.

'Great Scott'. Very large; gold and

antique gold blend.

Melon Tones

'Frances Fay'. Short. Very floriferous. Light pastel melon.

'Gertrude Smith'. Cream pink with melon overtones. Huge flowers of heavy substance.

Pink

'Annie Welch'. Luminous blush pink to flesh tones.

'Evelyn Claar'. Clear salmon-pink, golden throat.

'Pink Lightning'. Beautifully ruffled petals, clear pink.

Red and Maroon

'Bess Ross'. Bold, brilliant velvety red.

'War Eagle'. Deep oxblood red; wide petals.

Lavender

'Lavender Parade'. Lavender with green throat.

Iris

One of the most durable iris grown is the Siberian iris. This long-lived species is almost free of insect and disease pests. It blooms in late spring with delicate flowers on long stems. Shades of white, blue, lavender, purple and wine are available. Siberian iris is an excellent plant for flower arrangements and can be counted upon to give a big show of color in the garden.

Japanese iris blooms later and has large, regal, flat blossoms. It is considered by many to be the most striking of all the irises. There are many spectacular blends and bicolors. The color range is white, pink, lavender, blue, purple and maroon. Japanese iris makes a great accent plant for the pool, stream garden or the flower border.

The bearded iris group ranges from the early dwarfs to the later tall-bearded types with many intermediate classes. Hybridizers have given us a wide range of heights and colors to pick from. Almost every color in the rainbow can be found in the bearded irises. They thrive in well-drained soil and grow best in full sun. Attention, however, must be given to borers, which sometimes attack the rhizomes. The taller bearded iris varieties

Bearded iris 'Blue Sapphire' and the white-flowered gasplant (*Dic-tamnus albus*) make a good combination in the June garden.



George Taloumis

make excellent cut flowers. This is truly 'the orchid' of the hardy garden.

Summer Phlox

Phlox paniculata is an exceptional perennial because of its long period of bloom. Flowering begins about July 1 and, after a resting period from August 20 to September 10, it often continues to bloom through October. Clipping old flower-heads is not necessary, since flower buds are initiated in the old seed-heads and will produce panicles similar to the original ones. For more desirable effects, however, the heads can be sheared after the first flowering; this will result in a flatter, wider inflorescence for the second blooming. Another advantage in shearing is the removal of seeds before they fall to the ground and develop into seedlings which are likely to be of poor flower color.

New growth in the spring may be sheared when it is from 8 to 15 inches high, and this will promote a shorter, bushier plant. Summer phlox flourishes in a moist, well-drained, rich loam in which a substantial amount of organic material has been incorporated. Peat moss is an excellent material for this purpose.

Phlox tolerates light shade, but in full sun growth is shorter, stems are sturdier, and flowers are more abundant. If mildew is prevalent, phlox will benefit from

spraying with an appropriate fungicide at three-week intervals from May through September.

There are hundreds of cultivars. 'Elizabeth Harden' is a medium-to-short phlox with pale, lavender-pink flowers. 'Progress' has huge lavender-blue blooms with deeper eyes. 'Starfire' is one of the finest red phlox. 'World's Peace' and 'White Admiral' are good, tall, white varieties. 'Pinafore Pink' is an excellent, clear, pink, low-growing sort. 'Sir John Falstaff' and 'Windsor' are proven garden varieties in salmon shades.

Oriental Poppies

Papaver orientale is one of the most spectacular and brilliant perennials. Poppies have brightened gardens here and in Europe for many years with their bold showy flowers. They bloom in late spring and make fine companion plants for tall bearded iris, early peonies and other late spring-flowering perennials. Most varieties grow best in full sun but will tolerate light shade. Oriental poppies range in height from 2 to 3 feet. Their spectacular display is breath-taking and their brilliance is unexcelled.

'China Boy' has huge 8-10-inch blooms and is white with an orange border. 'Pin-nacle' is a beautiful ruffled bicolor with white flowers edged with orange. A spectacular clear pink with a whitish base



One of the earliest tall phlox varieties to bloom is 'Miss Lingard', its glistening white florets opening as early as late May on 3-foot stems. This is an old hybrid (probably of *Phlox carolina*), well worth the effort of trying to locate nursery sources for.

George Taloumis

is 'Show Girl'. 'Springtime' is a pure white poppy edged in pink. 'Arab Chief', with its huge 9-inch blooms of a deep maroon-red, stands erect on 35-inch stems. 'Harvest Moon' has 9-inch blooms of a clear yellow-orange. 'Lavender Glory' is the largest cultivar grown and its enormous size makes it a striking sight. The color is medium lavender with black basal spots. 'Lighthouse' is a pure light pink with large oxblood spots. 'Royal Robe' has flowers of unusual deep coral red. 'Barr's White' is a pure white with black basal spots. 'Big Jim' is a deep carmine red with a crinkly texture. 'Bonfire' is a large fiery red. 'Raspberry Queen' has the color of crushed raspberries. 'Maiden's Blush' is a very ruffled white with a one-inch light pink edge.

Oriental poppies will not last as cut flowers unless properly treated. The cut stems should be brought into the house immediately and their ends burned over a gas flame, charring the bottom 4 inches. They then last up to three days in water.

Soon after their spectacular display of bloom the foliage dies down and during July and August the poppies become dormant. Interplanting with annuals and summer bulbs has been successful. Oriental poppies do not tolerate a lot of water

and are very subject to rot during their normal dormant period. It is truly the "poor man's plant," thriving on lack of care and little water.

Peonies

Peonies have a great heritage in American gardens and are found in nearly every perennial border. They provide color and beauty in late spring and are an excellent cut flower. Their varied flower form gives the gardener a wide selection to pick from—single, Japanese, anemone or double. They do best in full sun and a slightly acid-to-neutral soil. Good drainage is essential. Peonies come in various shades of white, pink, red and maroon. They are extremely hardy and are able to survive very cold winters. Peonies are an easy plant to grow and thrive on neglect.

The so-called hybrid peonies which have two or more species in their blood lines possess a brilliant range of colors not found in other types. There are new tones of red—vermillion, scarlet and cerise—and new pinks such as salmon, coral, flamingo and cherry. Add to this pure lilac and waxy white. Many have open centers filled with tufts of contrasting stamens. These peonies bloom two to



Paul F. Freese

Herman Gantner

The peony is one perennial that is truly "perennial." Clumps last for years and years, producing more flowers each new season, as in this garden above. **Right:** Remove the lower, smaller buds from a stem so the major bud will be larger. Cut off carefully with a knife or pinch off with fingers.





Andre Viette

Hosta sieboldiana has large, blue-green foliage with the puckered texture of seersucker.

three weeks earlier than the Chinese peonies.

Typical examples of these hybrids include 'Red Charm' (full petaled and very dark red), 'Nadia' (clear cherry-red), 'Janice' (tall salmon-pink), 'Lustrous' (very large intense vermillion scarlet) and dwarf 'Paladin' (glowing cerise-red).

Astilbe

Astilbe, with its many varieties, is one of the finest, most colorful plants for shady location. They range in height from 5 inches to three feet and their blooming time can extend from June 1st to August 1st. Astilbe is also well adapted to the sunny garden, provided the plants are watered adequately. More and more landscape architects are using them in large mass plantings as ground cover plants. Among the most popular varieties is *Astilbe chinensis pumila*, which grows to a height of 8-12 inches and has rasp-

berry-colored blooms in July. 'Deutschland', 'Irrlicht' and 'White Gloria' are excellent whites in the 30-inch class. 'Erica', 'Peach Blossom' and 'Straussenfeder' are three of the most popular pinks. 'Europa' is one of the earliest to bloom and is light pink in color. 'Red Sentinel', 'Fanal' and 'Glut' bring strong red color to the genus. No partly shady garden should be without this fine plant.

Hosta

There are many species and cultivars of *Hosta* (*Funkia*)—and as much discussion about their correct nomenclature. The hostas, or plaitain-lilies as they are sometimes called, are very adaptable plants. They grow best in light shade, but some will tolerate deep shade. They grow best with a soil of good organic content and ample moisture but will tolerate dry or very wet conditions. Hosta are occasionally attacked by slugs, which can be

controlled by various commercial preparations. Plants are used mainly for their foliage effect, ranging in various shades from blue to green and including many variegated forms. Hosta have strap-like, spoon-shaped or rounded leaves (from one inch to as much as one foot wide). The flowering period of the numerous species and varieties extends from June 15 until frost. The flowers are found in the lavender or white shades.

Not only are hosta perfect ground covers for the shade, crowding out almost all weeds, but they are getting wide use as foliage material for modern arranging.

Among the most popular sorts are

Hosta sieboldiana and *H. sieboldiana* 'Mira', both with large blue leaves. *H. fortunei* 'Aureomaculata' exhibits beautiful citron leaves with a dark green edge. *H. crispula*, *helenoides*, *undulata* 'Albo-marginata', *decorata* and 'Louisa' are white-edged varieties. Best white-flowering kinds include *H. minor alba*, *plantaginacea*, 'Royal Standard', 'Snow Mound' and 'Snow Flakes'. *H. ventricosa* has very dark blue flowers and *H. tardiflora*, a dwarf, is the latest to bloom, bearing lavender-purple flowers. The new varieties of hosta now number in the thousands and there are many rare and beautiful varieties to choose from. ❧

Ornamental Grasses Belong in Today's Gardens

HARDY ORNAMENTAL GRASSES are versatile plants that deserve a prominent place in today's landscape. They add an air of simplicity to the popular Japanese-type garden, beautify the pool area, and provide a background for the perennial border. Their bold line effect not only adds strong accent to the garden, but also ornamental grasses are used effectively in naturalistic areas, especially around ponds. In autumn their seed plumes add a touch of beauty to gardens on the wane. Their winter foliage gives movement to the land and in the summer the gentle breezes play music through their leaves.

The refined green foliage of maiden grass (*Miscanthus sinensis* 'Gracillimus') is small and narrow. Zebra grass (*M. s.* 'Zebrinus') has deep green leaves with broad markings of pale yellow spaced three to six inches apart along the entire length of the blade. Both of these grasses have beautiful plume-like flowers in late summer and provide fine material for dried flower arrangements.

The blue foliage of blue wild rye (*Elymus glaucus*) reaches a height of approximately 4 feet and makes a fine background for rockeries and small shrubs.

All of these grasses grow best in full sun, but most will tolerate light shade. Propagation is by division in early spring or mid-autumn. The foliage attains its greatest beauty in a rich loam with adequate drainage. Depending on soil and culture the taller varieties vary in height from 4 to 8 feet. Spraying is not required because these grasses are relatively insect- and disease-free.

Some other grasses in the medium-to-tall height category are *Panicum*, *Pennisetum* and *Spartina*. Smaller ground cover and edging varieties will be found among *Acorus*, *Helictotrichon* (*Avena*, in part), *Carex*, *Festuca*, *Hakonechloa* and *Molinia*. Blue fescue (*Festuca ovina glauca*) is especially popular as an edging grass with its beautiful mounds of foliage.

—Andre Viette



Paul F. Frese

CHRYSANTHEMUMS FOR LATE COLOR

Paul F. Frese

MUCH has happened to chrysanthemums since the first Korean hybrids were introduced over forty years ago. Few of these early introductions have survived. Some still popular include golden 'Lee Powell', burnt-orange 'Carnival', richly colored 'Red Velvet' and salmon-pink 'Betty'. All are considered reasonably hardy. There are many more which are main sources of cut blooms and garden color in autumn.

For masses of color in borders, the cushion-type ranks high. Some are sold only by color. Others are offered by name, such as pink 'Amelia', one of the first introduced, and crimson-red 'Ruby Mound'. Most cushions have a self-branching habit and do not need to be top-pinned to induce branching.

Gardeners often are intrigued with the idea of growing florist-type blooms, sometimes called football "mums," in their gardens. This is entirely possible. Success depends first on variety selection. One group, bred to endure Midwest conditions and flower naturally before frosts arrive, includes bronze-red 'Cornhusker', claimed to produce 8-inch blooms. Home gardeners have been very successful with another group called Harvest Giants represented by deep bronze-red 'Indian Sum-

mer' and rose-pink 'Touchdown', both capable of bearing 7-inch blooms. In all cases, disbudding is necessary. The side buds at the end of each stem must be removed while small so that the remaining bud can mature to perfection.

There are many other cultivars capable of producing big exhibition-quality blooms of various forms, such as solid incurves, spiders and threads. Many are late-blooming and also require special time-pinning and daily shading for as much as six weeks under black cloth to bloom successfully.

Chrysanthemums flourish in good soil enriched with humus and flower garden fertilizer. Their growth must never be stunted for lack of water. Mulching is advised. Using liquid plant food as the buds form is helpful. Spraying at this point will protect the blooms from insect pests.

Young plants grown from cuttings, either by nurseries or home gardeners, are the best planting stock. Clean divisions separated from last year's plants are a second choice. Old clumps, left untouched, soon become diseased and bloom poorly. Plants in bloom, dug from fields or grown in pots, serve primarily as fill-in color in the fall landscape. 🌼

*Early in flower, easy to grow,
inexpensive, and increasing generously*

DAFFODILS

George S. Lee, Jr.

BEGINNERS who need the stimulus of quick success and veterans who require maximum results with minimum effort will find their answer in the daffodil. The daffodil (*Narcissus*) is certain to get each season off to a good start. This hardy bulb is ideal for those whose gardening enthusiasm expands as sap rises in the spring and contracts as soon as the golf course has dried off.

While culture can be as elaborate as one cares to make it, especially if blue ribbons at the local show are a lurking ambition, the essential needs of the daffodil are quite limited. Any good garden soil will do. A sunny spot is preferable although since most of the growth of leaves and flowers is made and nearly gone before deciduous trees are in leaf, some shade will be tolerated. However, bulbs should not be planted under evergreens. Good drainage is required for all varieties and species except *N. cyclamineus*. Depth of planting is not critical but 6 inches deep and apart from each other is a good rule for large bulbs, with shorter depth and spacing for smaller bulbs.

Daffodils are not gross feeders. If the soil is not impoverished, a little fertilizer worked into the soil well below the bulbs at planting time and a dusting of the surface when the new growth appears in the spring should be sufficient. Any fertilizer low in nitrogen and high in potash should maintain healthy growth. Unleached fireplace ashes are excellent or the tried-and-true 5-10-5 formula is good and widely available. Whether the soil is acid or alkaline is not important.

Daffodils need to be planted early in the fall. They are received by local suppliers in September and should be planted at once; never later than mid-October if

possible. After that the ground becomes chilled and rooting is likely to be delayed until spring, resulting the first season in late flowering. If the soil is dry, newly planted bulbs should be well watered after planting.

Formation of next year's embryonic flowers is totally dependent upon allowing foliage to ripen after flowers of the current season have faded. This means the foliage should not be cut, buried, tied or otherwise deprived of light until it begins to wither in late June. Those who find this brief period of maturing objectionable should use other plant material, such as ferns, to screen the daffodil foliage.

Success with daffodils is rarely jeopardized by pests or diseases. Older varieties have naturalized in many parts of the country and seem immune to the ailments which occasionally afflict the more highly bred modern varieties. In the warmer, more humid areas basal rot may be a problem, usually treated by digging up the bulbs after the foliage has ripened and dipping them in a fungicidal solution, then storing them in a cool, dry location until replanted in the fall.

The only widespread serious pest is the daffodil fly, the larva of which overwinters in the bulb and may destroy it, but unless the basal plate of the bulb is entirely consumed, recovery is possible in time. Presence of the fly may be detected by observing what looks like a bumblebee zigzagging over ripening daffodil foliage and emitting a shrill, buzzing sound. Protection is afforded by dipping newly planted bulbs in a solution, or dusting them with the powder or crystals, of whatever pesticide federal and state regulations permit and is available locally. (A less orthodox method for established



Marjorie J. Dietz

Combine daffodils in groups of one variety, as above, rather than mixing different kinds.

plantings is to snare the flies with a butterfly net.)

Under good growing conditions, daffodils increase steadily and may be divided whenever they become crowded. This can be done any time after the foliage begins to die. Bulbs may be replanted at once or dried off and stored until fall in well ventilated bags in a cool, dry place. Mulches may be applied to retard weeds and keep the flowers clean, but are not essential since most daffodils are hardy, including their impatient new foliage and even buds and open flowers which will tolerate a late spring freeze.

Daffodils look best in clumps or groups and varieties should be planted separately rather than mixed together. They are ideal along a path or in borders. Vigorous varieties may be naturalized in grass or open woods, but again each irregular drift should be of a single variety. Mowing the grass must be deferred until the foliage has ripened.

The range of daffodils as to size, form,

color, and period of bloom is much greater than realized. Some familiarity with the official classification of daffodils by which they are grouped in mail-order catalogs is helpful in understanding the diversity of daffodils. There are perfect miniatures, 3 inches high, and there are huge trumpets, 5 inches wide on 30-inch stems. The corona may be a long trumpet or a short cup; the perianth—or petals in lay language—may be flat or reflexed; colors are not confined to white or yellow, but may include orange, red, pink, green, lavender and buff in many shades and combinations. There are doubles in many forms, a new group called split coronas, many less well-known varieties with several flowers on a single stem, a few that are quite fragrant, and a good many species, some of which are sometimes easy but others often challenging.

There is a daffodil society: the American Daffodil Society, 89 Chichester Road, New Canaan, Connecticut 06840. ❀

*If for no other reason, include hyacinths
in a spring garden for the pure enjoyment
of their heavenly fragrance*

HYACINTHS

Paul F. Frese

EVEN a few clusters of hyacinth blooms will fill the air in early spring with their sweet scent. One need not plant the largest exhibition-size bulbs. Bedding-size bulbs will make an effective display, either in solid groups or clumps of a few bulbs in the foreground of a garden.

Select a sunny site where the drainage is good. Heavy wet soils are fatal. Prepare the soil thoroughly and set the bulbs 5 inches deep. A light winter mulch is desirable, particularly in cold climates.

The foliage of hyacinths remains green in spring longer than on most other bulbs. Perhaps, for this reason, hyacinths con-

tinue to bloom for many years, provided the foliage is left on to ripen and the bulbs are not disturbed.

First-year flower spikes are a solid mass of bloom. In fact, bloom stalks from exhibition size bulbs may be so heavy as to need staking. In later years, the stems are more slender with blooms less crowded. Usually, there will be several stems arising from the original bulb—ideal for cutting. Because of the cluster-flowered nature of hyacinths, they are colorful much longer than other spring bulbs which bear one flower to a stem. ❀

Hyacinths of mixed colors in combination with another popular spring-flowering plant—the pansy.



Roche

It is hard to picture a garden without tulips

TULIPS

Paul F. Frese

EVERYTHING about tulips is perfection—the clean classical form of the flowers, their complete range of brilliant and pastel colors and the precise arrangement of broad sculptured leaves along their stems.

The evenly measured height of all kinds of tulips and the way the wide-open blooms are poised makes them ideal for many landscape effects. They can be arranged in formal beds, geometric patterns, or planted in informal clusters in flower gardens or as foreground planting in relation with other landscape material. In all instances, groups of at least ten bulbs, all of one variety, are much more effective than scattered plantings of mixed varieties and colors.

As with all other kinds of bulbs, there is no substitute for deep and thorough soil preparation. Consider tulips as long-last-

ing perennials. The better the soil in the root zone below the bulbs, the sturdier the growth will be, not only for the first year but thereafter. Therefore, it is essential to dig in humus and balanced plant food deeply into the soil before planting.

The tulip genus, based on lineage, bloom form and habit of growth, is divided into several sections. To get the longest period of bloom and also to enjoy them all, it pays to plant as many types as you have space for. The cycle of bloom from the earliest hybrids and species to the late-flowering Darwins and doubles will provide a solid two months of color.

Flower form is an important factor, too, particularly when selecting tulips for cutting. Darwins have a solid deep form compared with the elliptical shape of



Photographs by Roche

Fosteriana hybrid tulips are prized for mass effects because of their uniform heights and the way the wide-open blooms are poised atop the stems.

The bold flowers of tulips contrast well with such spring-flowering shrubs as azaleas. Other shrubs that bloom at the same time as the later tulips are lilac, kerria, rhododendron, deutzia, spirea and weigela.



cottage tulips. Lily-flowered tulips, having pointed petals, are particularly choice for cutting. The fringe tulip class grows larger each year. No wonder—since the petals have finely fringed and feathered edges, rarely seen in other flowers except in orchids. Parrot tulips are the extreme, with their slashed and feathered petals and bold spectacular color patterns. All double tulips, both early and late, have tightly packed blossoms which last much longer than all other kinds, both in the garden and as cut flowers.

Tulips have one major weakness—a disease, botrytis fungus which first blights the tips of shoots and and later causes flower stems to flop and leaves to turn brown. As a precaution, spray with a fungicide such as Benlate as soon as the tips of flower buds show and again after flowering. Dig up badly diseased

bulbs, and be careful to remove all petals as they fall. A second weakness can be damage from mice. Just about any kind of mouse will eat tulip bulbs and this can be discouraging to those who garden in regions where mice are prevalent.

There is little advantage in most gardens in digging and storing bulbs as the foliage ripens, and replanting in the fall. In most cases where bulbs are planted in clusters in borders, they can either be arranged between summer-flowering perennials which will fill the space with their foliage, or can be interplanted with seedling annuals for summer and fall color.

Tulip foliage must be left on until it ripens and turns yellow. Otherwise, flowering-size bulbs for next year's bloom will not develop. When cutting tulip blooms for arrangements, cut above the second large leaf. ♣

*Hosts of varieties are now available
in a wide range of colors and flowering seasons*

LILIES FOR SUMMER GARDENS

Edward A. McRae

THE ARRIVAL of vastly superior hybrids has made the beauty of the lily a possibility in more gardens than ever before. Heights range from graceful miniatures to stately kinds 5 or 6 feet tall. Suitable for many garden settings, lilies are also ideal subjects for container culture. No garden should be without them.

The Asiatic lilies are perennial favorites because of their iron constitution, hardiness, sturdiness of habit and resistance to disease. They are May-to-July-flowering and range in height from 2 to 4 feet. The upright-flowering forms, the first to flower, are extremely popular; they are typified by 'Enchantment', which is grown worldwide for its vibrant orange flowers. 'Chinook', a newer lily, carries large candelabras of nonfading soft salmon flowers, producing a stunning effect. 'Connecticut King', an unspotted bright yellow touched with gold, demands instant admiration. 'Pirate' is the winner of numerous top awards, and its iridescent tangerine-red flowers are in a class by themselves. 'Pepper', with vivid non-fading red flowers, is spectacular when underplanted with white petunias. A unique member of this group is 'Sterling Star', with upright white flowers providing a pleasant foil for the more vibrant colors. One of the finest of the new lilies is 'Sunkissed', a lovely peach-suffused orange chiffon of breathtaking beauty.

An equally vigorous and dependable group is the Asiatic lilies with outfacing flowers. 'Paprika', a vivid deep red, has been grown for many years. 'Connecticut Lemonglow', a recent introduction, carries unspotted flowers of brilliant yellow. 'Sunrise' is a beautiful newcomer with lovely dawn-pink flowers spaced perfectly in tiers, on plants 2 feet tall.

The final group of Asiatic lilies consists of plants with nodding flowers. 'Burgundy', which produces deep glowing maroon reds, and 'Citronella', displaying bright yellow tones, are produced from F_1 strains, the results of years of patient breeding. The stately plants of 'Bittersweet' bear abundant large flowers of deepest orange; 'Sonata', almost identical in form, has flowers of soft salmon with rose-pink tips. 'Connecticut Yankee', with startling orange flowers, will brighten any garden. The magnificent 'Hornback's Gold' has numerous soft mimosa-yellow flowers borne on beautiful vigorous plants. This lily has won top awards in North America and Europe.

A new variant of the lovely Madonna lily (*Lilium candidum*) has recently been introduced as Cascade Strain. The result of thirty years of careful selective breeding, it is vastly superior to other forms in vigor and disease resistance. Madonna lilies must be planted in early autumn, with the bulbs covered with no more than one inch of soil; they will then overwinter with an attractive rosette of green leaves.

The native American species and hybrids are delightful and unusually easy to grow. The meadow or Canada lily (*L. canadense*) with its nodding flowers, usually soft orange in the wild, is perhaps the most charming of all species. The present hybrids are derived from West Coast species and carry fragrant, nodding flowers. The finest varieties are 'Nightingale' (vivid pink), 'Robin' (bright red), and 'Bunting' (soft buff with pink tips). These naturalize readily in cooler areas, and their unusual whorled leaves add presence to any setting.

The July-flowering Chinese trumpet lilies, and their hybrids with *Lilium*



George Taloumis

Herman V. Wall

Above: An old-fashioned flower border that features lilies. Also grown are such annuals as bachelor buttons. The low-growing edging plant is sweet-alyssum.

Right: The Imperial Gold strain of lily is an example of the modern lilies so popular because, being grown from seeds, they are free from the diseases that often plague lily bulbs. Many of these strains were originated in the Pacific Northwest by Jan de Graaff.



henryi, are truly spectacular. Most of these offered commercially are produced from F₁ strains, which guarantees their extreme vigor and freedom from virus disease. They grow best in a sunny location, and on summer evenings fill the garden with delightful fragrance. The lovely regal lily has been a favorite for many years and has been further improved in recent breeding programs.

The magnificent Black Dragon and Green Magic strains are white trumpet lilies descended from lilies grown in Chinese gardens for centuries. The stunning Golden Splendor strain, of more complex ancestry, has flowers of deep golden yellow, while the flowers of Moonlight strain are softer yellow with a lime-green reverse. The delightful Pink Perfection and Copper King strains complete the color range.

The Oriental lilies are the aristocrats of lilydom. Flowering in late summer, they are derived mainly from the gold-band lily of Japan (*L. auratum*) and the rubrum lily (*L. speciosum*). This lineage has produced lilies of exotic beauty, form, color and scent.

The true-breeding strains produced from crossing especially strong and persistent parents have opened up new frontiers, enabling these lovely lilies to be grown in a wider variety of climates and conditions. Produced from seed, they are free of the vegetatively-carried virus diseases which led to the demise of many Oriental lilies of past years.

In warmer parts of the country they should be kept as cool as possible and protected from the hot afternoon sun. The roots must be kept cool by the use of ground covers and mulches. The Imperial Crimson, Imperial Gold, Imperial Silver and Imperial Pink strains carry enormous exotic flowers in the appropriate colors, and all are admirably suited for container culture. Jamboree, Everest and Pink Glory strains have smaller, more reflexed, equally beautiful flowers. Especially strong and disease resistant are the clones 'Journey's End', 'Cover Girl' (with enormous, flat, soft pink flowers), 'Red

Baron' and 'Black Beauty'. It is especially recommended that Oriental lilies be planted in the spring in most climates.

Storing and Culture

Lily bulbs are available for both autumn and spring planting. Those arriving too late for autumn planting can be stored during the winter in a cool, frost-free location. Since they are never truly dormant, lilies must not be allowed to dry out. Bulbs are ideally kept in dry packing material in a box or plastic bag (with air holes to permit respiration) in the vegetable bin of a refrigerator.

Planting should not be undertaken until the soil is in good condition, for wet situations are the bane of lilies. Lilies require well-drained locations, and slight slopes are ideal. Good soil preparation is also highly beneficial. The smaller bulbs are covered with 2 to 4 inches of soil; the larger bulbs, with 4 to 6 inches.

The location depends largely upon one's climate and specific conditions. Lilies are extremely adaptable, and the majority can be grown in full sun or in partial shade. In warmer areas, protection from warm afternoon sun is recommended, especially for the lovely late-blooming Orientals.

Lilies are most charming planted in groups of three or more, spacing the bulbs 6 to 8 inches apart. Especially delightful with a background of evergreens, they make perfect focal points in the landscape.

All lilies perform best with cool conditions at ground level. Their affinity for "head in the sun but feet in the shade" can be accommodated by the use of shallow-rooted ground covers such as petunias or portulaca. Stunning masses of contrasting colors and textures can be produced by this natural mulching. Organic mulches, of course, can also be used; leaf mold or compost is suitable.

An adequate supply of water is essential before and during flowering. Afterwards, water is required only if a long dry spell occurs. Bulbs must ripen and mature after flowering, so too much water

after bloom time is detrimental.

A well-balanced fertilizer first applied after the lilies emerge is usually adequate. It should be incorporated into the top 2 inches of soil. A liquid fertilizer, such as fish emulsion or Miracle-Gro, applied when the lilies are 6 to 8 inches tall, is also good. Overfertilizing must be avoided. If groups become overcrowded, they must be lifted, divided and replanted in the fall.

Lilies are extremely lucky in their relative freedom from pests and diseases. Slugs can be a nuisance when the lily shoots are emerging, and a timely application of slug bait is a good remedy. Brown spots in early spring or during rainy periods are an indication of botry-

tis blight, which flourishes during warm, moist conditions. This disease is easily controlled with Benlate (benomyl). Planting groups of lilies some distance apart also helps control this disease by reducing chances of infection. If aphids (plant lice) are seen, they can be controlled by any suitable insecticide, or discouraged by washing plants in a soapy solution.

Removing old flowers prevents seed formation and its consequent weakening of the bulb. The lilies die down naturally late in the autumn, and old stems should then be removed and disposed of. Mulching the bulbs with leafmold or straw is recommended in colder climates; a mulch of 4 to 6 inches will protect bulbs from extremes of temperatures. ❧

Paul F. Freese

Olympic Hybrid lilies have strongly trumpet-shaped flowers. This strain is derived from a number of species—all with trumpet-shaped flowers.



*A bulblike plant with
attractive foliage*

CALADIUMS

Everitt L. Miller

FOR the homeowner who is looking for a plant with attractive foliage the caladium may be the answer. The plant tolerates a partially shaded area and grows beautifully in the summer flower border, terrace or small greenhouse. Its handsomely colored heart-shaped leaves, all interestingly patterned, range in color from cool whites and pale pinks to dark reds.

The caladium is most attractive from late spring through summer and early autumn, when the days are long and the weather warm. Due to the large size of the foliage, plants last longest in areas protected from wind and rain. The caladium also makes an excellent pot plant, provided it receives adequate water and is not placed in a dry location. The foliage is the important and colorful part of the plant as its flower is usually hidden among the leaves. The flower is inconspicuous, white in color and shaped like a small Jack-in-the-pulpit.

The tubers, ranging in size from an inch to 3½ inches across (the larger the tuber the better the plant), may be purchased around the first of the year. Cultural requirements are rather simple. As the caladium is a tropical plant of Brazil, warm temperatures, ample water, little feeding and a combination of loose, well-drained soil and organic matter are required to produce a handsome specimen. Plants do not tolerate frost.

For best results, caladiums should be started during the latter part of March in the house or greenhouse; that is to say, where they will receive day and night temperatures of 70° F. and a sufficient amount of light. The tubers, usually with three to five eyes depending on size, should first have all minor eyes removed



Gottlieb Hamplfer

The caladium has elegant, heart-shaped leaves, ranging from white to pink and red.

with a sharp knife, thus leaving the main, strong center eye to come on for growth. With only one eye, the plant will be stronger and taller, and the foliage will be larger.

The tubers are placed in a flat with a mixture of one-half sand and one-half peat moss, and lightly covered. A fungicide drench is recommended, using a watering can to eradicate soil-borne diseases and control root rot.

For a period of about six weeks they should remain in the flat, watered as necessary. As soon as the tubers have developed strong root systems and center eyes have started to grow, remove them from the flat. Try not to disturb the sand and peat around the roots. Place the rooted tubers in a 7-inch azalea pan in a soil mixture containing two parts good loam soil, one part sand and one part peat. By June the plant will be ready to place in the garden where it will require, for best results, either morning or late afternoon sunlight. Caladiums should last in the garden until the first frost. ❀

*For a wide rage of
solid colors, blends and bicolors*

DAHLIAS

Paul F. Frese .

DAHLIAS have greater value as colorful garden plants and as a constant source of cut flowers than most gardeners realize. No other garden flower can equal their range of color, size and form of bloom.

One may choose dahlias to fit the space available. Dwarf bedding types are excellent to plant in solid beds, or as clumps in a flower border. Taller kinds with medium-size blooms are effective as background plants in borders. Those with big flowers are impressive as specimen plants placed wherever the individual blooms show off best.

Dahlias come in a complete range of solid colors, blends and bicolors. Bloom size runs up to 12 inches in diameter—a showman's delight—down through medium, small and miniature. Flower form is classed according to petal arrangement and shape. Cactus-type dahlias have tubular or rolled petals.

The low-growing dahlias are increasingly used today for garden display. The flowers, which can be single, as above, or double, appear abundantly throughout the summer season.

Decoratives have flat, regularly arranged petals. Pompoms have small round blossoms 2 inches or less across. In general, the larger the flower, the taller the plant.

Obtaining the Plants

Dahlias can be grown from seed, more particularly the bedding kinds, such as the Unwin dwarf hybrids, and 'Redskin' which is covered all summer with 3-inch double blossoms in assorted colors on 2-foot plants clothed with bronze-red leaves.

Taller, larger-flowered dahlias can be raised from seed, too, including the cactus and decorative types. Dahlia specialists even offer seed from selected parents which might produce offspring of superior quality.

Though it is possible to sow seeds of bedding dahlias early in frames and still have bloom by late summer, it is

Marjorie J. Dietz



better to get a head start indoors, under lights, or in a greenhouse. This will advance the time of bloom and also give the plants time to form clumps of roots large enough for winter storage.

The conventional way to obtain named varieties is to buy roots from local suppliers or by mail from dahlia specialists and seed houses. Each root must have a piece of the old stem attached, for only from this point of the crown can new shoots grow. This must be borne in mind when dividing old clumps. Dahlia growers also supply green plants started from cuttings. They arrive in full growth and must be planted at once, either in the garden or put in pots and kept inside until the weather is warm enough for planting outdoors. Green plants cost half as much as roots.

Since dahlias are tender, they must not be planted before the weather is warm. Choose a sunny location. Dig the soil deeply. For fertilizer, old manure may be placed in the bottom of the planting hole, reinforced with garden fertilizer high in phosphorous and potash, low in nitrogen. Use a balanced liquid or dry fertilizer later when buds start to form.

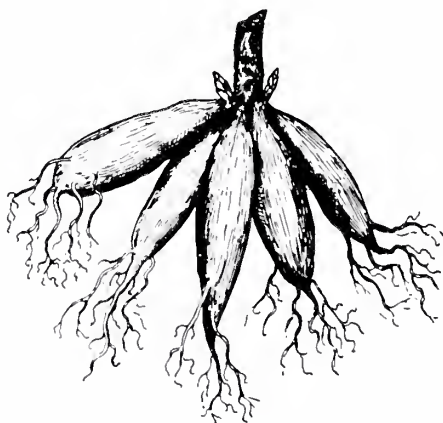
Set dahlia roots at least 4 inches deep. Cover with 2 inches of soil at first. Fill the hole level after the shoots are a few inches high.

During dry weather water freely. Without enough moisture, stems harden and growth is stunted. A mulch is advised. Spray regularly to control pests which can damage foliage and buds.

Dahlias, unlike many other summer flowers, are repeat bloomers. To get blooms on long stems, remove all but the largest terminal bud on a stem.

When cutting, snip the stem off above the first joint. New stems will originate at this point and produce more blooms later. On bedding dahlias, nip off old blossoms. This stimulates new flowering stems.

After the first frost, dig dahlia clumps, being careful to loosen all around the roots before lifting the clump. Shake off loose soil. Cut back the tops to within a few inches. Attach a variety label. Wrap each clump in several thicknesses of newspaper and pack into boxes or baskets for winter storage. Roots will remain plump if stored in a cool, frost-free place. ❧



A typical dahlia tuber. New shoot growth starts where tubers join the stem. When dividing the clumps, a piece of the old stem must remain with each tuber division.

An old favorite is making a comeback in American gardens

CANNAS

Robert J. Armstrong

THE dwarf large-flowered cannas now being grown are in marked contrast to the tall small-flowered ones of yesterday, which were used primarily for their tropical foliage effect in summer bedding.

Cannas are perfect for today's gardens in which low-maintenance plants are much in demand. Dwarf varieties with large flowers are available in a wide range of colors. Disease and insect pests are few and minor except where Japanese beetle is present; and once certain basic growing requirements are met, minimum care is required.

The canna is a frost-tender herbaceous perennial with a large underground rhizome from which the flowering stalks originate. Each stalk will produce three or more flower heads in succession. New flowering stalks are produced continuously throughout the growing season.

Cannas thrive when planted in a warm sunny area but are also well adapted to containers, either alone or with other plants. As such they are excellent choices for the city apartment dweller with a sunny balcony. They are very vigorous plants which respond to plenty of water and fertilizer, therefore spacing in the flower bed should be a minimum of 1½ to 2 feet. When the plants have finished flowering, they should be cut off at ground level to allow room for new stalks to take their place. Seed capsules should not be allowed to form, since they will reduce the vigor of the plant and the number of flowers.

Propagation is easily done by division of the rhizomes or from seed. When rhizomes are divided, each division should have at least one vigorous growing point. Dusting of cut surfaces with sulfur helps prevent rotting of the

rhizomes. Divisions may be started in large pots or planted directly in flower beds once the danger of frost is over.

In areas with mild winters, the rhizomes will survive and send up flowering stalks year after year. In the North rhizomes must be dug and stored each autumn if they are to be preserved. Dig just after frost kills the tops. The soil may be allowed to remain on the rhizomes, or better removed and replaced by peat moss. They should then be placed in a cool location where the soil or peat moss will remain slightly moist, but not wet. In the spring the rhizomes should be divided, and again planted in beds or containers after danger from frost.

Rhizomes of named cultivars are available from a number of commercial sources, and are often found at garden centers. Many of the more popular cultivars are from either the dwarf Pfitzer series or from the somewhat taller Grand Opera series.

Growing from Seeds

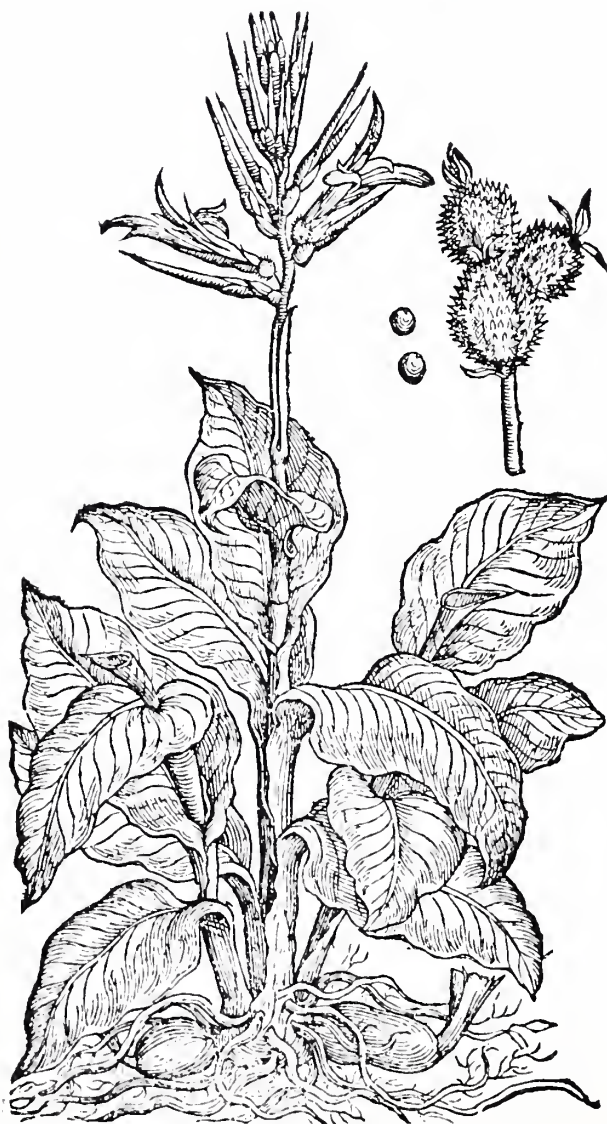
Seed is available from some firms either as single or mixed colors. This is the most economical way to purchase cannas provided there is need for a large number of plants and a place is available to germinate the seed and grow the plants. Flowers may be expected about twelve weeks after germination depending on the growing conditions. Seeds will germinate readily at about 70° F. Germination is hastened by scarification of the seed coat, which for the amateur is most easily done by rubbing the seed against sand or emery paper until the seed coat is barely penetrated in one or two locations. A small pair of pliers makes a good tool for grasping the seeds. The

seed is then planted just below the surface in seed flats. Germination may be expected within two weeks. When seedlings are three to four inches high they should be planted in individual pots using a rich potting soil. Once plants are well established, they may be planted in beds or in large containers.

A bed of mixed colors from seed can provide the adventurous gardener the

thrill of growing his own plants from seed, and should a particular plant strike his fancy, it may then be propagated by division of the rhizomes. If a bed of cannas perfectly uniform in height and color is desired, rhizomes of named cultivars should be used. If a single plant is desired, purchasing one already in flower at a garden center is most practical. 🌸

From Decorative Floral Engravings by Abraham Munting



The canna was once a tall plant with small flowers and lush tropical foliage, as illustrated by this old floral woodcut. Today's plants are lower-growing and have large, prominent flowers.

GROWING THE GLADIOLUS

Paul F. Frese

GLADIOLUS rank high as summer cut flowers. No other bulbous plants can match their color range—from pure white through pastel tints and prime colors to the darkest purples known in flowers. The endless variation in their color markings is always a matter of wonderment.

The effectiveness of gladiolus, both as cutflowers and in flower borders is extended by the plant's habit of flowering from the bottom of the spike upwards. Since some cultivars bear at least fifteen buds, there can be a full two weeks of continuous color from one plant alone.

Several devices can be used to extend the period of bloom from all summer to fall. One is to plant an assortment of cultivars which bloom at different times. The earliest may bloom in about 65 days after planting, the latest at least 90 days.

Smaller-flowered kinds generally bloom first. Large corms of the same cultivar will bloom ahead of smaller corms. And making several plantings of one kind at two-week intervals up to mid-June in the North will provide flowers until fall. In the extreme South, plant from September to March.

Planting can begin as soon as tree leaves unfold. Select a sunny site. Gladiolus thrive in most soils except those of heavy clay.

Gladiolus can be planted in rows for cutting or in groups among low-growing annuals and perennials in borders.

To plant in rows in freshly dug soil, open a trench 6 inches deep and as wide. Dust a little 5-10-5 garden fertilizer into the trench and mix it in. Plant two rows of corms, staggered, about 6 inches apart. Then partly fill the trench. When the



Paul F. Frese

Although gladiolus are grown mainly as cutflower material, in rows, they can also be used for garden display. The smaller-flowered varieties are most suitable.

plants are a few inches high, hill soil against them to serve as support later when they bloom.

Gladiolus must never get dry. Watering regularly provides the means for strong growth, even more than fertilizer. Lacking water, mulch heavily to conserve moisture and control weeds. When plants show four leaves, sidedress lightly with fertilizer.

It is useless to plant old corms saved from previous years which appear to be deeply pitted with scab. All corms, including new ones, benefit from a 30-minute soaking in Benlate solution.

Thrips is the major insect pest. When prevalent, it stunts the stalks and cripples the buds. For control, spray with malathion or other approved preparations. Corms which make stunted, diseased

growth should be dug and destroyed.

To cut blooms, press the point of a knife blade into the stalk where it emerges between the leaves. Bend the stem at this point until it snaps free. By not cutting the foliage, the plant can develop a large new corm, ready to be dug 6 to 8 weeks after flowering.

After digging, cut the tops off close to the corm, and spread the corms out in the sun for a day to dry. Then sift out the loose soil and place the corms in shallow wooden flats or boxes to cure for three weeks in a well-ventilated warm place. By then, the old corms and stems will separate easily from the new ones. Save the small cormels for planting stock. Store for the winter in open well-ventilated containers in a cool place, even down to 40 degrees. ❀

The most convenient way to grow gladiolus where ample space exists is in rows—perhaps in the vegetable garden. The corms are set in trenches about 6 inches deep.

Paul F. Frese



A favorite for terrace decoration

TUBEROUS BEGONIAS

Everitt L. Miller

INTERESTED in a large plant that is easy to grow and produces large and beautiful flowers? Consider the tuberous begonia. *Begonia x tuberhybrida*, as it is known botanically, is available in a variety of exotic colors ranging from white and pale yellow to orange and red. The plant has many different flower forms. Single flowers may be up to 8 inches across. Double sorts resemble either camellias, carnations, or roses. There is also a hanging-basket-type tuberous begonia that is most spectacular.

This is the ideal plant for deep shaded areas that have good air circulation and, vitally important, cool summer evenings. The tuberous begonia thrives when

planted in a bed under large evergreen trees or on the north side of a wall. It also does well as a pot plant for house, terrace, window box or greenhouse.

The cultural requirements of tuberous begonias are similar to those for other greenhouse flowering plants. They grow best with a pH between 6.0 and 7.5 and perform well in a soil mixture of three parts good garden soil, two parts peat moss, one part sand and two parts well-rotted cow manure. If rotted cow manure is difficult to obtain, garden compost may be substituted.

When grown from seed, which is started during late November or December, tuberous begonias require about the



Paul F. Freese

The tuberous begonia is suitable for window boxes and other kinds of containers in outdoor-living areas so long as air circulation is adequate and there is partial shade.

same culture as fibrous begonias, especially the popular outdoor wax begonia types, except that transfer to larger-sized flower pots as growth progresses should continue until the 6- or 7-inch pot size is reached.

When grown from corms, tuberous begonias should be started in February. Purchase good-sized, hard corms from a local horticultural supplier. Place them in a flat which contains a mixture of half sand and half peat, and keep this medium moist, at a temperature of 70° day and night. A fungicide drench is recommended to eradicate soil-borne diseases and control root rot. When the first shoots appear and a heavy root system

has developed, the plants may be potted, the pot size depending upon the size of the corm. Plants should be supported with light wooden or wire stakes.

The tuberous begonias will flower from June to September, but should not be placed outdoors until all danger of frost has passed. When plants are well established, weekly feeding with a good brand of water-soluble fertilizer (20-20-20) is recommended. *Caution:* Make sure plants have been watered before applying fertilizer. They can also be grown and flowered during the winter months, but additional light must be provided, since they require a 14-hour day in which to produce flowers. ❀



Paul F. Freese

The double flowers of the tuberous begonia look like those of roses, camellias or carnations. Colors range from pale yellow to orange and red as well as pink and white.

RIEGER BEGONIAS

Everitt L. Miller

A most exciting new flowering pot plant, one that has recently stimulated interest among home gardeners and professional horticulturists alike, is the beautiful, long-lasting Rieger begonia. The writer first became aware of this plant when he judged at the International Flower Show in Vienna, Austria, during the spring of 1964. Otto Rieger of Nurtlingen, Germany, who operates a commercial greenhouse founded by his grandfather in 1882, exhibited a small group of these begonias at that time. The judges were so impressed with the color and size of the flowers, the form and habit of the plant's growth, and the substance and richness of the foliage that they awarded Mr. Rieger a gold medal for his exhibit.

This flowering plant is now available commercially in the United States and

has become very popular with and important to the florist industry. The Rieger begonia comes in a number of striking colors, ranging from white and pale yellow to orange, pink and red. The plant has either single or double flowers, depending on the cultivar. The Schwabenland series has an upright form and makes excellent flowering pot plants for the house or greenhouse. They may also be used during warm weather on terraces, or in window boxes and flower borders.

The Rieger begonia performs best if protected from the wind and planted in a partly shaded location. However, as a house plant during the autumn, winter and spring months, it will tolerate full sunlight and 70° F. For superior flowering, the plant needs 14 hours of light. The Aphrodite cultivars, being more spreading, make excellent hanging bas-

A new breed of begonia—the Rieger begonia—has come from abroad. Its floriferous habit and attractive foliage have made it a popular summer pot plant. The plants are not as easy to grow as some begonias, such as the tough wax begonia, and seem to be prone to mildew and botrytis attacks. They need good air circulation and low humidity to ward off these diseases.

Hampfler Studios





Longwood Gardens

The Rieger Elatior begonia called 'Aphrodite Joy' has semi-double flowers and a spreading habit of growth that is well displayed in a hanging container.

kets. They range in color from orange to pink and red.

Since Rieger begonias do not form a tuber and are not available by seed, they are propagated by cuttings. The Schwabenland series is generally produced by leaf cuttings and the Aphrodite series by stem cuttings.

The recommended soil mixture is one part good garden soil, one part peat moss and one part sand or perlite. Growers at Longwood Gardens add to the mixture a half-part of hen-sized charcoal. Rieger begonias prefer an acid soil of pH 5.5 to 6.0. The plants grow equally well in both clay and plastic pots.

During the early stages of growth, the shoots must be pinched three or four times to obtain a bushy plant. Plants of the Schwabenland series should also be supported with light wooden or wire

stakes. Application of a water-soluble fertilizer (20-20-20) is desirable every ten days during the period of growth. It usually takes four months from the time a rooted cutting is potted for it to flower. The plant should be sprayed with fungicide to control mildew and botrytis. Good air circulation with low humidity also helps keep diseases to a minimum. Care should be taken to water the plant without touching its foliage.

Once the plant starts to flower it will continue to bloom for eight to ten months with a minimal amount of time spent on plant grooming, provided the proper environment is maintained. After flowering, the plant can be repropagated by cuttings or pruned back to 6 or 8 inches and allowed to rest (with very little watering) for a few weeks until new growth appears from the base. ❀

PLANTS IN CONTAINERS OUTDOORS

Alfred H. Krautter

MAN'S desire to be close to nature has helped bring about a great boom in container plants, including hanging baskets. Areas of brick, mortar and stone need to be softened, and terraces, swimming pools, front stoops and other bleak man-made structures often require plants for a "lived in" appearance. Choosing the proper plant for the proper container and fitting it aesthetically into a specific area where it will grow are the challenges to be met by creative gardeners.

Annuals are the most popular plants for containers and hanging baskets because many of them endure throughout the growing season with a prolific show of color. However, their size and growth habit should complement the container, so the selection narrows. Combinations or masses of single colors can be used. Some of the newer hybrids, bred for duration of bloom and dwarfness, are ideal for container growing.

In choosing the right plants, the

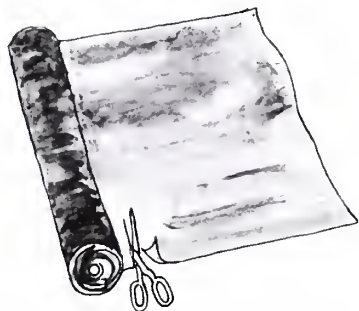
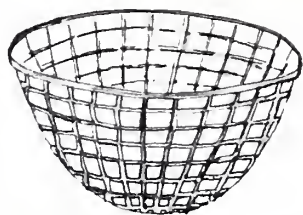
gardener must accurately gauge the hours of sunlight the site will receive, the wind factor and other problems that may be unique to the situation. Here is a list of twenty of the most popular annuals for containers, their best uses and light requirements:

Cultural Requirements

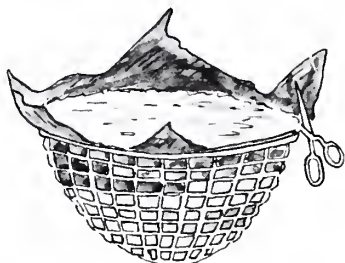
Soils for containers should be light and well drained, yet able to hold moisture and nutrients. A simple mix is equal parts garden loam, leafmold, peat moss (sphagnum), compost, sand, and perlite. To this add a 10-20-10 commercial fertilizer (one cup for half a cubic yard).

As a general rule, the soil in containers should be continuously moist but not waterlogged—there is a difference! Exceptions are for begonias, geraniums, marigolds and petunias, which do better in drier soil; water these well and then let them go a little dry before watering again. Avoid overhead-watering of con-

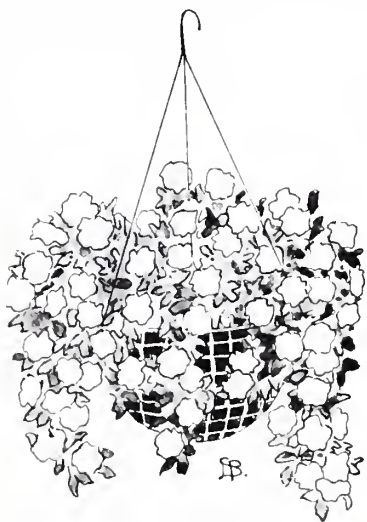
Name	Tub Plant	Com- bination	Hanging Basket	Full Sun	Light or Partial Shade	Shade	Low Air Pollution Resistance
Ageratum		x		x	x		
Begonia	x	x	x	x	x	x	
Browallia		x	x		x	x	x
Caladium	x				x	x	x
Coleus	x	x	x		x	x	
Dusty Miller		x		x	x		
Fuchsia	x	x	x		x	x	x
Geranium	x	x	x	x			
Impatiens	x	x	x		x	x	
Lantana	x	x	x	x			
Lobelia		x			x	x	x
Marguerite	x	x		x			
Marigold	x	x		x	x		
Petunia	x	x	x	x			x
Salvia		x		x	x		x
Sweet-alyssum		x		x			
Thunbergia			x	x	x		x
Verbena		x		x	x		
Vinca (Periwinkle)	x	x		x	x		
Zinnia	x	x		x			



CUT PLASTIC LINER TO FIT



TRIM EDGES AFTER FILLED



ATTACH HEAVY WIRE HANGER

Kingwood Garden Center Notes

tainer plants. Make sure all containers have drainage holes so that the soil doesn't become soggy. The larger the plant and the smaller the container, the more watering will be required. The more porous the container, the more watering will be needed, too. A hanging pot of fuchsia may need to be watered two or three times on a hot summer day.

With heavy watering, which these plants require, heavy fertilizing must follow because nutrients are quickly leached from the soil. A constant-feeding program is very effective. In this procedure a very dilute amount of water-soluble fertilizer, one-tenth the normal rate recommended on the package, is applied daily. A stock solution is made up and every time watering is done this solution is used. It is so diluted that there is no risk of injuring the plants, yet there is a uniform supply of nutrients. A high-phosphate fertilizer, such as 15-30-15 in liquid form, is recommended for the purpose.

Overwintering

In most cases, it is probably easier and better to start with new plants of most tender perennials each spring or to take a set of new cuttings from old ones. However, sometimes, particularly with standards (tree-form plants), this can become expensive and the gardener may want to over-winter these plants. In this instance, the general recommendation for the Greater New York region and areas with a similar climate is to leave the plants outside until Thanksgiving, bringing them temporarily into the house on those few nights when frost threatens.

Once the plants are brought in permanently, place them near a sunny window in a humid room. About January 1, cut the plants back severely to within 2 or 3 inches of the crown, but make sure some foliage is left to carry on photosynthesis. Reduce watering. As the plant develops new breaks, pinch the tips off the new growth after it has developed three sets of new leaves. Continue doing this until the plant has formed a nice, full head. Increase water-



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April—ANNUALS. Include these favorite plants and have a better garden this year. Landscape uses and annuals for various purposes. Growing them in containers. Regional tips.

May—ROSES. A primer on America's most beloved plants. Best varieties and their year-round care. Pruning, hybridizing and exhibiting. Gardens to see.

June—MULCHES. Let this Handbook show you how to cut down on weeding and watering this summer. Superior mulches and how to use them with various plants.



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February—HOUSE PLANTS. A fine complement to the above. Unusual kinds and how to grow them. Begonias, gloxinias, indoor bulbs. One-hundred house plant portraits. Potted trees for modern interiors.

March—SUCCULENTS. Introduction to the cactus family and desert plants from many parts of the world. Illustrated dictionary of fifty kinds. "Flowering stones," epiphyllums, mesembryanthemums. Culture and propagation; book and nursery lists.

April—AMERICAN GARDENS—A TRAVELER'S GUIDE. Take time off this month or next to visit some of these showcases of beauty. Over two hundred are described, with travel directions, hours, main collections, etc. Lavishly illustrated.

May—GARDENING IN CONTAINERS. Hanging baskets, window boxes. House plant culture without soil. Kinds of containers. Roof gardening. Miniature gardens.

June—PROPAGATION. Fascinating but easy-to-apply techniques for increasing indoor and outdoor plants. The ins and outs of rooting cuttings and growing plants from seed. Plant hormones and plastic. Further readings.

July—DYE PLANTS AND DYEING. There's no alchemy to this increasingly popular subject, and the Handbook tells you how to go about it the easy way. Recipes from many countries, dye plant culture and historical background. Good bedside reading.

August—AFRICAN-VIOLETS AND THEIR RELATIVES. A nitty-gritty look at America's most popular house plant. Episcias, columneas, achimines, streptocarpus and many other kinds, too. Pictorial dictionary. Breeding, propagation and pest control.

September—GARDENING UNDER ARTIFICIAL LIGHT. Ideas for the basement greenhouse. The mechanics of light and how plants respond. Questions and answers, source lists.

July—SUMMER FLOWERS FOR CONTINUING BLOOM. Trees and shrubs, vines, perennials and selected annuals for flowers during the lean hot months when gardens seem to go to sleep. Vacation gardening. Summer flower arrangement.

August—DRIED FLOWER DESIGNS. Keep the flowers you pick along the roadside or in the garden. Best techniques of drying, also use of silica gel and glycerine. Arrangements for various purposes.

September—BULBS. Now is the time to plan a vivid display for next spring, and this issue will likely provide all the information you need to have. Bloom calendar and ways to force bulbs in winter, too.

October—PRUNING. How to prune for size control and ornamental beauty. All major groups of woody plants are covered in this Handbook, which is one of the standards in the Botanic Garden series.

November—SOILS. The right way to use fertilizer, compost and lime. Making topsoil from subsoil. Where to have soils tested. Help make Mother Earth give her very best.

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Paul F. Frese

Above: Cascade petunias decorate a terrace. White varieties of petunias as well as of other potted annuals show up well at night, an advantage for a terrace.

Right: Sun-drenched decks sometimes seem cooler when flowering plants are avoided and evergreens are used instead. Here, a pine tree has been placed in a square tub whose lines complement the deck's pattern.

George Taloumis





The impatiens grows gracefully in a hanging basket but is also attractive in a tub or other type of container. It is a continuous bloomer in light or partial shade.

Pan-American Seed Co.

ing and feeding program. Do the last pinching about April 1 and then allow the plant to grow and bloom. Tie up the heavy branches as they begin to elongate so they won't break.

After all danger of frost has passed in spring, place the plant outside. Adjust it gradually to the stronger light and harsh winds. Once hardened off, the plant can be placed in its permanent location. The same procedure can be followed with other plants in containers or hanging baskets, but in most cases the other plants get too leggy and old, and just don't do well in a low-humidity house.

Patios and Terraces

In a discussion of container plants, the current boom in terrace gardens must be considered. The desire for living in one's own garden, even in the city, has created a great demand for evergreens, flowering trees and shrubs, shade trees, vines, perennials, roses, even fruits and vegetables. All of these plants must be

grown in containers on a concrete terrace.

Besides the ordinary problems of watering, fertilizing, pruning and insect control, there is the challenge of overwintering many of these plants in containers. Being above ground, the containers make the roots of plants, otherwise hardy, subject to alternate freezing and thawing—and possible winter-kill. To help overwinter such plants, take the following precautions:

- 1 Select the hardiest species.
- 2 Use large containers; the greater the soil volume, the less alternate freezing will occur. Keep watering—don't let the soil be bone dry as freezing weather approaches.
- 3 Insulate containers by grouping, enclosing with styrofoam, or protecting with leaves (if available) for winter.
- 4 Protect plants from winter winds, using an anti-desiccant spray, burlap or other shields.
- 5 Shade plants from winter sun. ❧

A little more effort for magnificent results

ROSES COMPLETE THE GARDEN

Frank H. Abrahamson

FEW ROSES require pampering to produce a splendid show of blooms. But, to insure maximum performance, be prepared to maintain a regular schedule of watering, feeding, and dusting or spraying to keep the plants growing vigorously and free of diseases and pests.

There are several classes of roses, all useful, that will grow well wherever the soil is well drained, and where they can get at least four hours of sunlight a day (preferably in the morning). They must be out of range of competing roots from nearby shrubs and trees.

Here are typical ways to use roses. Species and shrub types are ideal for filling gaps in the shrub border. As ground covers, use ramblers or creeping varieties such as 'Little Compton Creeper', *wichuraiana* and 'Max Graf'. Cover walls, fences, lattice or arches with repeat-blooming climbers. In the rock garden, use the charming miniatures which are also favored as winter house plants under proper growing conditions. Low-growing floribundas quickly develop into compact, ever-blooming plants suitable to plant in borders or as a low hedge. Hybrid teas and grandifloras are striking either as specimen plants among annuals and perennials, or set in beds by themselves. For a formal effect, or to enjoy something unusual, plant one or more hybrid teas which have been grafted onto a sturdy understock to produce a tree rose.*

The final choice of varieties, of course, depends on your preferences for fragrance, color and the use of the flowers—for garden effect, exhibition in shows, or to arrange in the house.

To begin with, however, consider

these time-tested, universally acclaimed varieties:

Hybrid Tea—'Crimson Glory', 'Mirandy' or 'Crysler Imperial' (red); 'King's Ransom' (yellow), 'Peace' (yellow and pink blend), 'Tiffany' (pink), 'Tropicana' (orange-red), 'Blanche Mallerin' (white)
Floribunda—'Spartan' (red), 'Circus' (red, yellow, pink), 'Betty Prior' (pink), 'Fashion' (pink blend)

Grandiflora—'Golden Girl' (yellow), 'Queen Elizabeth' (pink), 'Montezuma' (rose-salmon)

Climber—'Blaze' (red), 'Dawn' (pink), 'Golden Showers' (yellow)

Roses may be planted at almost any time except when the ground is frozen. Bare-root plants are generally "in season" from November until April. You can get them locally or from mail-order nurseries. Most of the latter send colorful catalogs on request once or twice a year. If you do not see their advertising, ask the American Rose Society (Box 30,000, Shreveport, Louisiana 71130) to send you a list.

If the growing season has begun before you think about buying your rose plants, it is better to get potted plants from a local nursery or garden center where you may select them while they are growing and blooming.

Planting Methods

The actual planting operation is much like that for any other deciduous shrub. Put the roots of bare-root plants in a pail of water as soon as they are unpacked, and plant them within the next 24 hours if possible. (If you can't plant them for a few days, after soaking the roots a few hours, heel in the plants in

*For a more complete discussion of rose varieties, rose types and how to use them, refer to the *HANDBOOK ON ROSES*, published by the Brooklyn Botanic Garden.



George Taloumis

Steps in planting of a bare-root rose: Spread roots over mound of soil in hole. Then press soil firmly around bush, water well and prune back to healthy buds.

a shallow trench or hole, being careful to cover the roots with soil.)

Dig a hole deep and wide enough to hold the roots of each plant without bending them upwards. Mix a cup of superphosphate and a shovelful of organic matter (peat moss, compost or well-rotted animal manure, etc.) deeply into the soil in the bottom of the hole. Make a mound of top soil in the center of the hole and fit the bare-root crown on it until the bud union (the knob where the main stem and branches join) is about at ground level; spread the roots down the side of the mound. Cover the roots with top soil. Tramp the soil firmly around the roots and fill the rest of the hole with water to work out any air pockets that may be left. After the water settles, fill the rest of the hole with soil and build a mound about 8 inches high around the stems. After the leaf buds begin to sprout, remove this protective mound.

Next, put a 2-inch-deep mulch of ground corn cobs, buckwheat hulls, sawdust or another similar material over the top of the beds to help conserve water, keep the ground cool, cut weed growth and to some extent prevent diseases from spreading by keeping water from splashing. Sprinkle fertilizer containing nitrogen on top of this layer, to help it decay and to counteract loss of plant nutrients taken from the soil by decaying mulch.

Start regular spraying or dusting (either method is effective) as soon as growth begins. A mixture (which you can buy) containing Phaltan (for black-spot), Karathane (for mildew), Kelthane (for mites) and malathion (for insects) has worked well in recent years. New chemicals constantly appear on the market, however, and your garden store may carry a better combination suited to your particular area. Apply it faithfully once a week, regardless of whether or not there are signs of damage. When diseases appear, often it is too late to cure them. If you prefer to dust, do it in the evening when dew will help it stick better. If you spray, get out early



Paul F. Frese

Roses require a regular spraying or dusting program to insure the best performance.

in the morning so that the sun will dry it as soon as possible. Cover both the upper and lower leaf surfaces thoroughly. Remove and destroy any spotted leaves as soon as they appear.

Watering and Feeding

To water roses properly, attach a soil-soaking device to the garden hose and give the beds about an inch of water. Do not use sprinklers which will wash off protective dusts or sprays and spread disease in splashing water drops. Repeat this operation once a week during the growing season.

Give each newly-planted rose a light feeding (about one handful) of a well-balanced fertilizer (like 5-10-5) after the first blooming period is over. Start feeding established bushes (in the garden one year or more) earlier—as soon as spring pruning is finished and before they start to grow. Give three feedings during spring and summer, unless you are using ureaform fertilizers, which need to be applied only once each year (in the spring) to supply all the nitrogen that a plant needs for the entire season.

Cut off faded blooms just above the top five-leaflet out-facing leaf on the stem. You can cut longer-stemmed flowers for indoor use from established plants, but always leave at least two five-leaflet leaves since new shoots will develop from

the buds at their base.

After the second killing frost forecasts the approach of winter, strip any remaining leaves from each plant and destroy them. Cut back tall canes enough to keep them from whipping in the wind and loosening the roots. Then tie the canes together. If the ground freezes solid in your area, bring in enough soil from another part of the garden to hill up an 8-inch mound around the base of each bush. After the first of the year, lay old Christmas-tree branches on top of the beds. This will keep the ground frozen during any winter thaws, and prevent heaving which could injure roots.

As soon as the danger of killing frosts is past and buds begin to swell, limber up your pruning shears and remove all dead, diseased and weak stems. Cut back until you find white wood clear to the pith of each cane. Remove all wood one-quarter inch above an out-facing bud to produce an upright bush, or above an in-facing bud to make a compact plant. Paint all cut surfaces with orange shellac, or cover them with tree paints to keep boring insects out.

There is no substitute for a regular spraying or dusting, watering and fertilizing program, if you want to succeed with roses. Other plants will prosper under the same care, too. ☘

NEW DEVELOPMENTS IN ROSE GROWING

Fred J. Nisbet

ROSES are America's favorite flower, yet all too many gardeners have none at all because of their ill-deserved reputation of being hard to grow. This is a myth that dies hard.

Yesterday

In the past, growing roses *was* difficult. Often they were short lived, especially in cold climates, and replacing them was expensive. But this was mainly the fault of the gardeners, not the roses themselves. There was an insistence on treating them as "bedding plants" and not as the more-or less hardy, woody shrubs they are. As a result, we did just about everything possible to reduce their blooms and shorten their lives.

First we insisted that roses needed heavy soils, even clay, which really restricted root growth and proper drainage. Then we pruned the plants unmercifully every spring, generally to three or four canes so short that each held only three to five buds. We thus threw away most of the stored nutrients which should have been left to produce blooms. The reasoning was that this was the only way to produce long-stemmed blooms. This was true, but there weren't many stems and no one needed them that long anyway.

Then we hoed the beds regularly to destroy weeds and create a dust mulch, which was supposed to conserve moisture. What was actually accomplished, after destroying the weeds, was to conserve little if any moisture and raise the soil temperatures enough to restrict the roots which were not damaged by the hoeing.

Fertilization was too often given only once, very early in spring. Then after the first bloom, fertilizers and water were put aside "to allow the plants to rest before fall bloom." Some growers even

pruned their roses again to assure long-stemmed blooms in the fall. What they really did was to further weaken the bushes.

Breeders used to give little consideration to disease resistance, so mildew- and blackspot-prone varieties were common. Also, pesticides then were barely adequate and had to be used weekly or after every heavy rain. Finally, some gardeners pruned their plants in autumn more than necessary in order to prevent wind-whipping and avoid proper winter protection. This further reduced the stored nutrients the plants needed to carry life over the lean months. Naturally, winter-kill increased.

Today

We understand the needs for roses better now and treat them as the shrubs they truly are. The result is more blooms, less winter-kill and far less work. Also, rose breeders give more attention to disease resistance and better rootstocks so we have better plants to work with.

Now we leave more of the bush intact at planting, usually with four or five canes. (When established, five to seven are left over winter.) This means at least a foot of cane for new plants and about two-thirds of the total height on older ones, unless they are growing too high, when the height can be reduced one-half.

All during the growing season roses should have at least an inch of water a week, either from rains or irrigation. Light soils require more and heavy soils a bit less. The leaves should not be spattered, as this encourages blackspot. Porous hoses and "spaghetti tubing" can keep the water on the ground, but are slow and have to be moved frequently. Recently a semi-porous plastic pipe has been devel-



George Taloumis

This *Rosa centifolia* shows how well many of the "old-fashioned" shrub roses can be used today to fill a special landscaping need. Most shrub roses require a minimum of care compared with hybrid tea roses, even in very cold climates.

oped. This is buried about 8 inches in the ground between rows and the whole garden watered by simply turning one faucet. (International Plastics, Inc., Colwich, Kansas 67030.) It puts the water where needed, avoiding evaporation regardless of heat or winds, and keeps the leaves dry.

Nowhere has there been more progress than in pest control. A big breakthrough came several years ago with benomyl (Benlate), a fungicide which kills mildew and blackspot on contact. In addition it enters the plant tissues, where it repels diseases for at least two weeks. Rains can't wash it off, so the time saved is considerable. A few gardeners add a little Phaltan, as well, for extra insurance.

Not long ago, equipment manufacturers made pest control easier and more effective as well. They adapted for small gardens the huge fogging or misting machines used by orchardists. These machines are run by electricity (house current or rechargeable batteries), and give a finer coverage than anything else before. This allows savings in materials, too. Putting these developments together simply means that roses are no longer hard to grow. ✻



Fred J. Nisbet

In cold climates, rose bushes can be protected by improvised tall cylinders, eliminating the need for scraping up surrounding soil. Bushes then need less pruning in spring.



The 'Pixie' tomato is one of several small-fruited varieties that bears bountifully and is suitable for growing in containers or in the open ground.

Burpee Seeds

A source of satisfaction as well as nutritious foods

THE HOME VEGETABLE GARDEN

Joseph M. Lent

A home vegetable garden, well planned and properly cared for, can be a source of satisfaction as well as a supply of a variety of nutritious foods. Fresh vegetables from the garden are usually superior in quality to those purchased from a store and are readily available when needed. A home vegetable garden can also provide healthy outdoor exercise and education for the entire family.

Most vegetables grow well under a wide range of conditions, but experienced gardeners generally prefer a well-drained area free from stones and with a soil that is high in organic matter and easily worked. Vegetable gardens should be located where they will receive at least five or six hours of direct sunlight each day and away from the shade of trees and buildings. If unable to do this, plants such as cabbage, beans, broccoli and the leafy vegetables will tolerate partial shade better than tomatoes, corn, potatoes, cucumbers, melons and root crops.

Make a complete plan of the garden on

paper before ordering seed or transplants. The crops should be arranged so tall-growing vegetables, such as corn, will not shade the shorter ones. To practice succession cropping, early maturing plants such as spinach, lettuce, snap beans and radishes should be grouped so that after harvesting, the soil can be reworked and refertilized. This area might then be replanted with late crops for autumn use and winter storage or processing.

In small gardens, intercropping can be used by planting late-ripening crops—tomatoes, melons or cucumbers—between the rows of early ones, such as peas or spinach. Lettuce can be set between cabbage and cauliflower and harvested before the others are fully grown.

Gardens should not be prepared while the soil is wet. A good test is to take a handful of soil and press it into a ball. If it does not crumble under slight pressure, the soil is too wet. Spade or plow the garden 6 to 8 inches deep. Commercial fertilizer can be added to supply the three

plant nutrients usually lacking in most soils, namely nitrogen, phosphorus and potash. A fertilizer containing 5 per cent nitrogen, 10 per cent phosphorus and 10 per cent potash (identified on the package as 5-10-10) should be broadcast over the garden at the rate of 40-50 lbs. per 1,000 square feet. Before planting, rake or rototill the fertilizer into the soil. Prior to a second planting, and after harvesting the early crop, approximately 2 lbs. of fertilizer per 100 square feet should be worked into the soil.

If animal manure is available, spread it over the garden before plowing or spading. Well-rotted cow manure should be used at the rate of 15 bushels per 1,000 square feet and to supplement the phosphorus, 25 lbs. of superphosphate should be applied. As an alternative, poultry manure may be added at 8 bushels per 1,000 square feet, supplemented with 7 lbs. of 5-10-10 fertilizer to balance the potash.

Lime should be added only when the results of a soil test show the need for it. Information about soil tests can be obtained from a local garden center or the

cooperative extension service. A garden soil should be brought to a pH of 6.5 for optimum results. One of the best investments a gardener can make is spending a few dollars to have the soil tested. Proper recommendations as to lime and fertilizer will be made by the testing service.

At planting time, rake or harrow the garden soil, doing only the portion you intend to plant right away. Mark off the rows using a string as a guide. Make a trench with the corner of a hoe or similar tool to the depth recommended on the seed packet. Plant the seed in the bottom of the trench, cover with soil and firm gently. When using transplants, be careful to keep as much soil around the roots as possible. If the flat or pots in which the plants are grown are thoroughly soaked with water before removing them, the soil will stick to the roots. Dig a hole larger than the ball of soil and set the plant slightly deeper than it was in the flat or pot. Water each transplant with a cup of starter solution or water. Commercial starter solutions are available at garden centers.

Herman Gantner

A big help today for home gardeners is the fiber or peat pot in which the plant roots grow right through the walls. Here a tomato plant's roots have penetrated the pot—and plant and pot are being set out in the hole. If plants are to be staked, placing the stake before planting the tomato is a good idea.



Suggested Vegetables for a Garden Approximately 25' x 25'

Distance between
rows in inches

18 Peas 1st planting as early as possible) Followed by seeding of late beets, carrots, lettuce, snap-beans, spinach, or plants of late cabbage or cauliflower, whatever the family likes.
18 Peas 2nd planting 10 days after 1st	
18 Peas 3rd planting 10 days after 2nd	
12 Onion sets	
12 Onion sets	
12 Lettuce followed by endive	Radish followed by lettuce
18 Spinach followed by snapbeans	Parsley
18 Cabbage plants followed by late beets	Broccoli plants followed by late carrots
18 Beets followed by fall spinach	Carrots followed by late lettuce
18 Swiss Chard - use all season	Kale
18 Snap Beans for canning or freezing followed by late rutabagas	
24 Lima Beans (bush)	
24 Shell Beans or Parsnips (leave in ground)	
24 Tomatoes	
24 Tomatoes	

Roche



Pole beans are supported by long bamboo stakes.

If the garden soil has been properly prepared, very little cultivation will be needed. Usually just a light scraping with a hoe will be all that is necessary to control weeds.

Since natural rainfall is seldom sufficient, it usually is necessary to irrigate in some way. In general, a vegetable garden requires an inch of water a week, which can be provided by a sprinkler. The amount of water being applied can be measured by setting a coffee can on the ground in the sprinkler area.

Organic mulches, such as salt marsh hay, sawdust and straw or synthetic materials, such as black plastic, may be used to control weeds, conserve moisture and keep the vegetables clean.

Careful attention should be given to the selection of varieties because new ones are being constantly introduced. The best sources of information on varieties are seed catalogs. For varieties recommended for home gardens in your area, consult the local county extension service.

Pest Control

Pest problems can be reduced by buying disease-free transplants, purchasing varieties that are disease-resistant (noted on the seed packet), practicing good weed control and prompt removal of all debris and infected plants. If possible, a good crop rotation should be followed—that is, closely related plants should not be planted in the same area of the garden for more than three years.

Environmental conditions influence disease and insect problems. When these are right for the propagation of plant pests, only chemical remedies can control them. A preventive spray or dust program has proved to be the most satisfactory approach for their treatment. General-purpose vegetable spray or dust mixtures are available under numerous trade names at garden centers and hardware stores. These can be purchased as dusts, wettable powders or liquid concentrates. Dusts are generally the most convenient to use but are easily washed off by rain and so must be applied more often than sprays.



Herman Gantner

Black plastic mulch controls weeds among vegetables, at the same time helping to warm the soil for such crops as melons and cucumbers. Here cucumbers are being set in holes made in the mulch by cut-off tin cans.

An all-purpose pesticide should contain at least two insecticides, carbaryl (Sevin), malathion or methoxychlor, as well as one or more of the following fungicides: Captan, Ferbam or Zineb. In general, these multi-purpose mixtures will control aphids, cabbage worms, cutworms, flea beetles, maggots, Mexican bean beetles, Japanese beetles, leaf miners, leaf hoppers, white flies and squash borers. Blights, mildews and anthracnose are controlled by the fungicide in the mixture. Before purchase, the label should be carefully read. The chemical content should be noted, as well as the diseases and insects the mixture is intended to control. All precautions, dilutions, frequency and method of application should be followed.

Under wet, cool conditions, garden slugs and snails can be a problem, although their number can be reduced by clean cultivation. Hand picking at night, using a flashlight and an old spoon, may be practical. There are also commercial preparations which can be purchased.

For more complete information, see BBG Handbooks, *THE HOME VEGETABLE GARDEN* and *NATURAL GARDENING*. ❧

*The back-to-nature trend has created
a renewed interest in fruit growing*

FRUITS FOR THE HOME GARDEN

Donald K. Ourecky

FRUIT trees and shrubs have the unique property of being attractive around the home as well as providing an edible product. The nutritive value and diverse flavors add greatly to any diet.

Fruit plants have been cultivated since recorded history and today more than ever before, more varieties are available which ripen over a long period of time, possess special qualities, store longer, are adapted to given areas or are resistant to specific insects and diseases.

One of the most important facts a gardener must learn is that not all of the glowing catalog descriptions of a given fruit can be realized in his area. For example, not all fruits are hardy enough to withstand the very cold temperatures in the North, nor can many of the fruits be grown in southern areas where the rest period is too short. Site, soil and consequently the varietal response may vary by locality.

In planning a fruit-growing adventure, the space available will determine the number and size of plants one can use. Poor planning can result in meager production due to crowding and at the same time make insect and disease control difficult. Less space is required for bush fruits and strawberries, but most fruit trees require considerable space. Dwarf rootstocks are available for apples, making them attractive for use as espaliers, hedges or wall coverings and possible where a regular-size apple would be too space-consuming. Less satisfactory stocks are available for the other tree fruits.

With a well-planned garden and adequate space, a gardener can have fresh fruit from June to frost in northern latitudes, with a more extended season farther south. The personal reward of producing a superior product is satisfaction

for any gardener.

Today varieties are available for every region of the United States. For the latest recommendation on varieties, insect and disease control, and weed control consult your local county extension service.

The Small Fruits

Strawberries are the most widely grown of any temperate fruit. They are among the first to ripen in spring and possess one of the finest flavors known to mankind. The fruit is one of the most versatile but, as a fresh product, one of the most perishable. Early ripening as well as very late and everbearing varieties are available.

Strawberries will grow on a wide range of soils, but heavy, poorly drained soils should be avoided. An adequate level of moisture should be available throughout the entire growing season. A slightly acid pH is preferred. Plants may be used in borders or planted in rows. Rows may be 4 feet apart with the plants allowed to run freely, forming an 18-inch mat, or the runners may be constantly removed, keeping the plant in the form of a hill.

Strawberries may be grown in unmulched rows, through a black or clear plastic mulch, or placed in unusual containers such as a barrel. In northern climates a straw mulch is usually placed over the plants, to a depth of 2-4 inches, for insulation against extremely low temperatures which may freeze the crowns. In most other areas a mulch is used to keep the soil cool, control weeds, conserve moisture and keep the fruit clean. Plants in a hill system may be planted as close as 18 inches, while field planting is recommended at 2 feet within a row and 4 feet between rows for the matted row. Many planting systems are available.

Several root diseases are serious in strawberries, especially in garden plantings, but resistant varieties are available. In certain areas, leaf diseases are important. Each locality has its insect problems.

There are too many strawberry varieties to mention in detail. Leading ones in the North include 'Sparkle', 'Catskill', 'Midway', 'Redchief', 'Guardian', 'Holiday' and 'Earlidawn'; in the Central States—'Redchief', 'Atlas', 'Apollo', 'Titan', 'Cardinal', 'Guardian'; in the South—'Florida Ninety', 'Tioga', 'Earlibelle', 'Albritton', 'Sequoia'; in California—'Tioga', 'Tufts', 'Heidi', 'Sequoia', 'Aliso'; and in the Northwest—'Shuksan', 'Benton', 'Rainier', 'Olympus' and 'Northwest'.

Raspberries, a once plentiful fruit, are seldom found on the market or when available are very expensive. This is the favorite fruit of many, combining high flavor with high acidity.

Raspberries are native to northern regions and areas with a good supply of moisture during the entire year. A few wild species are found in the South. Plant breeders have developed varieties which are more heat tolerant and require a shorter rest period. Red, black, purple and yellow varieties are available.

Most all raspberries are summer fruiting—that is, they produce a cane one year, fruit the second and die. Fallbearing red raspberries are available, producing fruit on the current season's cane. Most of these varieties ripen from early August until frost. For any connoisseur, this is one way to extend the fruiting season.

Raspberries require full sun, adequate soil moisture the entire year and a fertile loam with good drainage. Purchase only healthy, virus-free stock because a planting may last many years.

Most raspberries produce suckers which arise sporadically and form a thicket. The black and most purple types produce long canes which root at the tip. Raspberries are kept in bounds by mowing, light cultivation to control weeds and suckers, or by pruning to form a hill. The most serious insect problems are crown borers, fruit worms and tarnished plant bugs.

Northern red varieties include 'Taylor',

'Newburgh', 'Latham', 'Reveille', 'Milton', 'Scepter' and 'Citadel'; fall-bearing ones are 'Heritage', 'Fallred', 'Augustred' and 'Fallgold'. Black varieties are 'Dundee', 'Bristol', 'Jewel', 'Allen', 'Huron' and 'Allegany'. Purple ones include 'Patriot', 'Clyde' and 'Amethyst'. 'Cherokee' and 'Pocahontas' have been released from Virginia, 'Dormanred' from Mississippi, and 'Southland' from Illinois. Western varieties include 'Willamette', 'Fairview', 'Haida' and 'Meeker'.

Blackberries are either trailing or erect. 'Darrow' is widely grown in the North and is one of the most popular erect types. It is productive and has good quality. None of the present-day varieties are hardy enough for areas with extremely low temperatures. 'Cherokee' and 'Comanche' have been released for Arkansas and the central United States. 'Brazos', 'Humble' and 'Floragrand' are adapted to the South. A number of thornless, semi-trailing varieties, e.g., 'Black Satin', 'Dirksen', 'Thornfree' and 'Smooth-stem' have been released but are not hardy north of the 40th parallel.

Boysenberries and loganberries are not sufficiently hardy for northern climates. Nearly all of the major commercial plantings are located on the West Coast.

Currants and gooseberries should be included in any fruit garden. Black currants have been restricted from distribution in the United States because they are the alternate host for white pine blister rust. However, varieties immune to this disease are known. Of the red currants, 'Red Lake', 'Stephen No. 9' and 'Wilder' are the most popular. 'White Imperial' is one of the best white-fruited types. 'Poorman' is one of the finest American gooseberries, red in color and high in quality. 'Pixwell' is sold generally but lacks quality.

Gooseberries and currants are very hardy and need little attention. They are pruned by removing a portion of the old canes periodically and replacing them with new and more productive canes. One of the serious insect problems is the cane borer, which can ruin a planting. Leaf spot causes early defoliation, result-

ing in lack of vigor and hardiness, but it can be easily controlled.

Grapes provide endless variation. There are three major uses or types of grapes, namely wine, table and juice. 'Concord' is the best known juice grape. It is high in quality with a distinctive flavor and is hardy. Other hardy table grapes are 'Interlaken Seedless', 'Delaware', 'Himrod', 'Niagara', 'Ontario', 'Buffalo', 'Alden' and 'Seneca'. Varieties also vary in hardiness and season of ripening. 'Delaware' and 'Catawba' are widely grown for the making of wines, along with the French hybrids 'DeChaunac', 'Aurore' and 'Foch'. Space does not permit the listing of all varieties. There are also varieties adapted to the southern United States and California.

In grapes, fruit is borne on new shoots; therefore, vines must be vigorously pruned to limit the number of buds which will produce shoots. Excessive shoot production results in weak canes with small

poorly filled clusters. For the home garden, several systems of training may be used. New shoots which develop may be trained along one or two support wires, in an arbor or on a single post. Pruning may be done after leaf-fall, but before late March in northern regions. Select healthy, dark brown canes. Estimate leaving 8-15 buds per cane, more if extremely vigorous and less if the vine is small. For example, a 'Concord' vine under good culture should be pruned to at least 30 buds. For each additional pound of estimated prunings, after the first pound removed, leave 10 additional buds. For two pounds of estimated prunings, 40 buds should be left, etc. Varieties vary greatly in their vigor depending upon soil and site.

Blueberries, which were once an obscure fruit, enjoy wide distribution and popularity today. Lowbush forms are found in Maine and Minnesota. Highbush forms are the most widely grown. Rabbit-

Growing Your Own Strawberries



There are many planting systems to follow for strawberries. Home gardeners, who usually must work with limited space, can make up their own system or adapt one from specialists' recommendations. This gardener is setting the plants 12 inches apart and spreading the roots in the ground so the crown is level with the soil surface.

eyes are grown exclusively in the South. Of the highbush varieties 'Bluecrop', 'Blue-ray', 'Earliblue', 'Collins', 'Jersey', 'Berkeley' and 'Coville' are the most popular. They are best adapted to an acid soil, or the soil can be acidified by the addition of sulfur or other conditioners. For only a few bushes, sulfur plus peat moss may be added.

Cultivated blueberries ripen over a long period, hold fruit in good condition on the bush and are very hardy. They are pruned like most shrubs with a gradual renewal of wood. Blueberries are very attractive landscaping shrubs, but don't grow them as clipped hedges; the majority of fruit buds will be pruned off. Birds are a serious problem but can be controlled by netting the plants before the fruit ripens. A few insect and disease problems can become serious.

Fruit Trees

Apricots and peaches bear earlier in life

than the larger fruit trees. Their low height makes them useful in small gardens. Various dwarfing rootstocks have been used, but to date few have proven satisfactory.

Apricots are seldom grown in many of the mid-Atlantic states because they bloom very early and are subject to spring frosts. In more northerly areas, 'Alfred' and 'Veecot' are highly recommended at this time.

In the Northeast the peaches which are most widely grown include 'Redhaven', 'Candor', 'Brighton', 'Harmony' and 'Cresthaven'. In the mid-Atlantic States 'Loring' could be planted instead of 'Harmony', and farther south, 'Earlired' instead of 'Candor'. Valsa canker, borer and plum curculio are the most serious problems.

Plums and pears add variety to the fruit garden. Again, no highly recommended rootstocks or dwarfing stocks are available, but the trees are smaller than



Remove blossoms from newly-set standard varieties the first spring; with everbearers, remove flowers up to early July, then stop so plants produce first-year crop in fall.



A salt hay mulch keeps berries clean, prevents formation of weeds and in cold climates can prevent crowns of plants from being injured by extreme cold.



Photographs by Herman Gantner

The reward of good culture comes when the first strawberry fruits are picked.

cherry and apple. Like most fruits they benefit from complete weed control in their early years. A mulch is very effective. Guards may have to be placed around the tree trunks to prevent mouse or rabbit damage.

Two of the highest quality prune-type plums are 'Stanley' and 'Italian'. Of the Japanese plums, 'Beauty', 'Shiro', 'Abundance', 'Burbank' and 'Santa Rosa' are the most popular and are well adapted to light soils. European varieties are self-fruitful but benefit from cross pollination. Japanese ones require cross pollination, so two varieties should be planted. European and Japanese varieties are not suitable pollinizers for each other. Two additional types of plums which are interesting include the Damson and the Gages.

One of the serious problems in growing pears south of Pennsylvania is fireblight. None of the present varieties are immune to this disease. For southern areas 'Magness', 'Moonglow', 'Dawn' and 'Maxine' are grown. In the Northeast, 'Bartlett', 'Gorham', 'Aurora', 'Bosc' and 'Highland' are recommended. No suitable dwarfing rootstock are available. Quince has been used but it is not compatible with some varieties and does not produce a well-anchored tree.

Apples and apple products are consumed in the largest quantity per capita

of all the temperate fruit crops. Varieties have been developed for the fresh market, processing and juice. The trees are extremely hardy, widely adapted and of ornamental value during flowering, and even useful as ornamentals. 'Red Delicious' and 'Golden Delicious' are the leading varieties in the country, followed by 'McIntosh', 'Rome' and 'Jonathan'. For gardeners interested in high quality, 'Empire', 'Jonagold', 'Mutsu' and 'Spigold' are highly recommended. Other interesting apples include historic varieties and crabapples. In order to produce a good fruit, select the proper variety and adhere to a good insect and disease control program.

Of great interest to gardeners is tree size. A named apple variety may be obtained grafted on a specific rootstock. For example, a highly vigorous tree may be obtained when grafted on Malling 1, M.13, M.16 or Malling Merton 109. These trees vary from 90-110 percent in final size when compared to seedling rootstocks. From a tree which is 60-85 percent the size of a standard, such stocks as Malling, 2, M.4, M.11 or Malling Merton 104, 106 and 111 may be used. For halfsize or smaller trees, Malling 7, M.8 and M.9 are in common use. Many new rootstocks are being developed and will soon be available. Each stock has specific uses and characteristics.

Apple trees can benefit from mulches but they do increase mouse damage and fire hazards. Trees should be planted on a well-drained site, at least 2 inches deeper than the depth of the plant from the nursery. Prune to form a well-spaced scaffold of branches. Heading back and occasional thinning out is the standard pruning practice.

Minor fruits can round out any planting by providing a wide range of fruit types, flavors, season of flowering and ripening. Such a planting might include persimmons, papaws, elderberries, Juneberries, mulberries, beach plums, dwarf cherries and highbush cranberries. (For further information see the BBG Handbook, FRUIT TREES AND SHRUBS.) ♣

HOW TO MANAGE GARDEN SOILS

THE soil in lawns and gardens is seldom satisfactory for plant growth without proper preparation. It is, however, less costly to modify the soil that one has than to replace it with so-called top soil. All too often purchased soil is no better, and sometimes far worse, than the existing soil. Besides, new soil often introduces more weeds and pests into the garden.

Good drainage is important for good growth of most plants. Poor drainage means that water has replaced the all-important air in the soil, which smothers the roots. Roots require air just as much as do leaves. Some plants are more sensitive to this than others. Roses, cherries and yews are but a few plants that are seriously damaged by wet soils. Depressions that hold surface water, and downspouts from the roof that are not connected to drains are two common sources of trouble.

The only satisfactory method insuring adequate drainage of heavy soils is the installation of lines of agricultural drain tile to carry excess water to a lower level, a drain or storm sewer. Four-inch tile, set 12 to 18 inches beneath the surface, with the lines of tile 25 to 30 feet apart, will be sufficient. Allow an inch or two of drop for each 100 feet of line. There is no need of worry that this will dry out necessary moisture because it only removes the excess.

The use of rocks, stones, bricks or cinders in the bottom of a flower bed, which is so often recommended, does not remove water from a heavy soil; it merely makes a good cistern to hold it.

Proper grading of the soil surface is helpful but does not always solve the problem. Hillsides can be poorly drained if there is a layer of hardpan or impervious clay beneath the surface.

Techniques for Improving Soils

Organic matter in the soil is all-important. Most soils do not have enough of it for the best growth of plants. There should be at least 3 to 5 per cent organic content, and for most plants 15 or even 20 per cent will give even better results. In other words, it is almost impossible to have too high an organic content. Often, the addition of organic matter to the soil gives better results than an application of fertilizer. The reason for this is that with better soil aeration, there is greater root growth. Clay soils, especially, need more organic matter to improve drainage as well as aeration. Sandy soils need it to increase their moisture-holding capacity. Organic matter should be thoroughly spaded into the soil.

Inorganic materials, such as sand, fine cinders, and coal ashes, are not nearly as effective as organic materials. Besides, they do not furnish the materials needed by microorganisms in the soil to carry on their all-important work.

Organic matter varies greatly in price, so it pays to consider carefully what to buy. Barnyard manure is the traditional thing to use but usually it is more expensive than other forms. Unless fresh, it contains little actual fertilizer value, but in any event it can still be a good soil conditioner. All too often, manure contains a variety of weed seeds which may become pests.

Peat moss is usually the least expensive material available. Most of it is weed-free, odorless, disease- and insect-free. It is available in compressed bales of varying size, as well as in bulk. Since it varies in moisture content, weight is not a good basis for comparison. Cubic content is equally confusing. So it comes down to comparing, bushel for bushel,



Roche

One of the most economical ways to add humus to the vegetable garden is to grow a cover crop, such as winter rye. The seeds are usually sown in late summer or early fall. In early spring, the crop is forked under, as here, or a power tiller can be used to incorporate the rye with the existing soil.

how much loose fluffed-up peat you get per dollar spent. Peat moss runs from 85 to 95 per cent organic, but produces an acid reaction, which can be corrected by the addition of lime as needed.

Other organic materials suitable for improving garden soil are sawdust, shavings, straw, old hay, rotted leaves, buckwheat hulls, shredded bark, peanut hulls and other materials available locally. A layer of any of these materials, dug into the soil when preparing the garden each spring, will improve its structure. If any of these materials are more or less decomposed, they may be used without danger of plant starvation caused by the soil bacteria taking most of the soil nitrogen while decomposing them. If they are not decomposed, fertilizer containing nitrogen must be applied. This same problem occurs when mulching plants with any undecomposed organic mulch. It also occurs when growing seedlings or plants in paper pots, even in waxed paper milk cartons.

Organic matter added to soil is broken down and used by soil organisms so it is necessary to replace it every few years. This is one reason why it is necessary to do over flower beds and borders and repot house plants. As this organic matter is destroyed, it leaves the soil darker.

Too many gardeners believe that dark soil is richer and better than light-colored soil. This is not always true. Nor is a black woods soil usually rich. This is just another of those old fallacious garden beliefs.

Soil Acidity

Soils are acid in many regions (especially the eastern United States) having sufficient rainfall for plant growth because the basic (alkali) chemical elements—calcium, magnesium, sodium, potassium, etc.—have been leached away, leaving more of the acidic elements. Limestone soils are less affected than others, but even these eventually become acid in the upper layers.

Just why acid soils injure many kinds of plants is not fully known: deficiency of calcium and magnesium, toxicity from aluminum and manganese, inactivation of phosphates, disturbance of beneficial microorganisms, or all of these together may be contributing factors. Acid injury need not trouble, however, since liming materials are a simple cure, and easy to use.

Recording acidity in pH units has advantages in science, but is somewhat confusing to the layman, for the pH scale is an exponential series rather than a

straight arithmetic one. A pH of 7 indicates a neutral soil, and the acidity increases rapidly as the numbers become lower. Experience has shown that growers soon associate needs with pH values, and that only changes greater than a half-unit are important. Furthermore, experience has shown that as much limestone is needed to change from pH 6 to 6.5 as to raise pH 5 to 5.5, because of slower action where the acidity is less. The entire range for soils is from around pH 3.5 in swamp peats to about pH 10 in alkali soils of arid regions.

Probably there is a best pH for each plant species, but it is fortunate that most kinds of plants will make reasonable growth over a considerable range. A low pH is disastrous for many plants, such as the common garden beet. Some other crops in this group are spinach, lettuce, cauliflower, onions, and peas. At the other end of the scale, rhododendron, azaleas, mountain-laurel, blueberries, and a few other species require a low pH. Most of the common garden ornamentals are in the pH 6.5 group.

Soil acidity is not easily diagnosed from the appearance of a soil or the plants grown. The best procedure is to arrange for a professional soil test by a state or private laboratory engaged in that work.

Lime and Application

There are many kinds of liming materials, but limestone taken from a quarry and ground is the most common. Fine grinding is necessary for rapid and complete action, so the usual specification is that 50 per cent of the product shall

pass a 100-mesh sieve. Ordinary or calcic limestone consists largely of calcium carbonate. Magnesian or dolomitic limestone is a special type containing considerable amounts of magnesium carbonate replacing part of the calcium carbonate of calcic stone. It is preferred as it supplies both calcium and magnesium as well as neutralizing soil acids.

There is no formula for rates of application that applies to all soils, for this depends on the quantities of clay and organic matter; the heavier the soil, the more liming material.

The limestone should be mixed with the soil. Spading in 7 to 8 inches is ideal for small gardens. For larger areas, it is best to plow or spade in one-third of the lime and cultivate in the remainder. This procedure applies to construction of lawns, but for growing turf, only broadcast applications are possible. These help, but act more slowly.

Liming can be overdone, but this is unlikely if guided by soil tests. A pH of 7.5 is a danger sign. Damage from too much lime can be overcome for some crops by the use of borax and manganese. In other instances, it may be necessary to acidify the soil with sulfur. The local soil-testing laboratory will be competent to advise.

A last word—liming is not permanent, and a retest is necessary after a 2- or 3-year interval.

What to Know About Fertilizers

Most soils are lacking in some degree in one or more elements necessary for plant growth. The three most important

Rule-of-thumb for Applying Lime

To increase the pH by one unit, for each 1,000 square feet of area to be treated add:

- 35 pounds of fine limestone for very sandy soils
- 50 pounds of fine limestone for sandy loams
- 70 pounds of fine limestone for loams
- 80 pounds of fine limestone for heavy clay soils

of these are nitrogen, phosphorus and potash. Other elements sometimes lacking are magnesium, manganese, boron and iron. The latter, and others are called trace elements. There are localities where one or more may be the limiting factor in plant growth. Consult your county extension agent or state experiment station for advice.

State laws require that the analysis must appear on every fertilizer package, giving the per cent of available nitrogen, phosphorous and potash, expressed in this order as 5-10-5. Since soils vary from one place to another, even in the same garden, and since it is not possible to know the exact requirements of each and every kind of plant, the best one can do is give them all a balanced diet. Usually, one kind of fertilizer may be used on everything, without fear, for the plants cannot read the labels!

If a fertilizer contains nitrogen, phosphorous and potash it is called complete. If the components are chemicals it is an inorganic or commercial fertilizer. If it is made up of plant or animal products, it is organic. Except that the chemicals are often more quickly available than the organics, it really makes no difference to the plants, the claims of organic gardeners to the contrary. Once the nutrients are dissolved in the soil so the plants can use them, the elements available to nourish plants are the same.

Ordinary commercial fertilizers, though soluble in the soil, are but slowly soluble in water so are usually applied dry. Although nitrogen and potash dissolve and leach down into the soil rather quickly, phosphorous penetrates but a scant inch a year. For this reason it is well to mix the fertilizer with the soil at the time of planting. Never put any fertilizer in direct contact with the roots for they may get burned.

Special fertilizers are available today that are quickly soluble in water. In these, the phosphorous penetrates the soil to reach the lower roots. Many of these fertilizers have a high analysis, containing as many as 60 units of nutrients. Typical

analyses are 19-28-17; 23-21-17, 20-20-20. Dissolved in water and used according to instructions, they are perfectly safe. But to use them as you would a dry fertilizer is dangerous because of their greater concentration. The same is true of the 10-10-10 and 12-12-12 farm fertilizers now available. They can be used if mixed with the soil but often burn if put on top of the soil where plants are growing.

Plants soon exhaust the nutrients in the soil. Nitrogen and potash both leach away, and so must be replenished at regular intervals. Seldom do we apply them as much or as often, as plants can utilize. Fertilizer once dissolved in the soil moisture moves downward only, never laterally. Consequently it must be spread uniformly over the entire surface of the soil. Every square inch should receive its share. This is easy to do with a spreader on lawns and other areas where no plants are in the way. Otherwise, the fertilizer must be spread by hand. It may take practice to do this evenly. Weigh out a pound and spread it on a patch 5 by 5 feet. This will be at the rate of 4 lbs. to 100 square feet, which is the maximum recommended for a 20-unit nutrient commercial fertilizer, such as a 5-10-10 or 10-10-10.

Gardens should be fertilized every spring, preferably before growth starts so there is little danger of burning foliage. For most garden flowers, a second application may be made in June and a third in September. The roots of plants take in the nutrients as long as the soil is not frozen.

Soluble fertilizers will take up moisture and ruin the package unless they are kept in glass or plastic so moisture can not reach them. It is best to buy only enough to last one season. They are used dissolved in water at recommended rates to fertilize flower beds, lawns and other ornamental plants during the growing season. (Consult the BBG HANDBOOK ON SOILS for complete information on soil, and good soil management.) ♣

BE A COMPOST MAKER

Conrad B. Link

ORGANIC MATTER is an essential component of good soil. It is not a permanent part of the soil and so must be renewed continually. In the garden this matter may be supplied as manure or as compost. Animal manures are expensive and not always obtainable, especially in or near large cities, where gardeners must often use other materials. Peat moss is one of the well-known types, easily handled and readily purchased. Local products useful for gardens may be available, such as leaves, shredded bark, wood chips, peanut hulls, shavings, buckwheat hulls, ground corn cobs and shredded sugar cane. They are not all of equal value, and some of them are better adapted for mulching purposes than for immediate incorporation into the soil.

The Home Compost Pile

The efficient gardener can produce much of the organic matter his soil needs by composting plant refuse—making artificial or synthetic manure. It is not difficult. A compost pile does not take up much space but should be hidden from view. Leaves provide the major garden waste material useful for composting but other materials may also be used, *e.g.*, straw, hay, shavings, lawn clippings, and nongreasy kitchen waste.

Usually, a compost pile is built up gradually as materials become available. The first step is to make a layer of the plant refuse about 6 to 12 inches thick. (Diseased or insect-infested material should be destroyed, not consigned to the pile.) On top of this, lime is sprinkled to make a white covering, and a complete fertilizer such as 4-12-2 or 5-10-5 is added. About one pound of fertilizer and one to two pounds of lime are sufficient for each cubic yard of organic material. The fertilizer provides nitrogen,

which is needed by the microorganisms of decomposition. This nitrogen later becomes available to the plants. Phosphorus and potassium also are changed in such a way as to become more readily available to plants. Lime prevents the decaying material from becoming too acid, and provides more favorable conditions for bacterial action. The amount of lime used is not enough to produce an alkaline reaction, and so the compost may be employed even for plants that need an acid soil.

As more material becomes available, more layers with lime and fertilizer are put on, until the pile is at a convenient working height. It is important that the material be moist enough to encourage decomposition. As the pile is built, each layer should be watered; and the entire pile should be watered in dry weather. Make a depression on top of the completed pile to catch the rain. Some gardeners put a sprinkling of manure or garden soil over each layer to add more bacteria.

After two or three months turn the compost pile over. This will help aerate it and mix the materials at the outside of the pile with those on the inside, speeding total decomposition. Large piles built up all at once may heat rather quickly inside. This high temperature is often sufficient to kill many disease and insect pests.

During the summer usable compost can be made in four to five months. Compost started in autumn requires a longer time. The nature of the materials used also affects the time of decomposition; for example, soft green plant material decomposes more quickly than dried leaves. Partially decomposed compost may be used as a summer mulch or mixed with existing soil when you set out shrubs and other plants. ❀

INCREASING YOUR OWN PLANTS

Victor H. Ries

GROWING plants from seed, and rooting cuttings, is so easy that no longer need any one say, "I do not have a green thumb, so cannot grow my own plants." A small nursery bed where small plants do not have to compete with big ones pays dividends in increased growth. And every good gardener should have at least one coldframe for starting plants. Use fluorescent lights for growing plants from seeds and cuttings indoors.

The use of modern soilless mixes that are sterile, weed-free, non-compacting will give results most of the time provided they are kept watered and not too hot. A mixture of equal parts sand and peat moss is ideal. Some seeds give improved germination and early growth if shredded sphagnum moss is used. Other sterile materials are vermiculite and perlite. In any case, a 1-inch layer of this material, placed on top of a screened mixture of equal parts soil, sand and peat moss is foolproof. Thus the seeds germinate in a disease-free medium, but

can extend their roots into a growing medium. Cover seeds with sand and peat moss sifted not over one-eighth inch deep with a soup strainer or fly screen sieve. Covering may also be done with the sterile mediums alone. Sowing may be in 3- or 4-inch clay pots plunged in sand, in shallow flats, or seed trays available from garden supply stores.

Outdoor sowing in a coldframe usually gives better plants than indoor sowing. A sash-covered frame may be used and seeds sown when pussy willows are in bloom. Transplant seedlings when an inch or so high to flats or directly into the soil in the frame. Space them one to two inches apart. Seed flats and seedlings may require watering every day. It is the drying out that does the damage. It is difficult to over-water a porous seedbed mixture.

Seeds of many woody plants, such as trees and shrubs, must be sown in the fall so as to have a couple of months of below-40-degree temperature before they



Home gardeners can increase many shrubs from cuttings, following the same methods used on a larger scale by professional propagators. Here, evergreen azalea cuttings are being dipped in a rooting hormone (obtainable at garden centers or from mail-order sources) before being placed in a flat.

Herman Gantner

will germinate. This also applies to bleeding-heart, trollius, many wild flowers and some rock plants. If in doubt, fall-sow in November. This can be done with all hardy perennial flowers and with hardy annuals as well. In most cases a 3-inch pot is ample for home use.

Rooting cuttings of hardy flowers, evergreens, shrubs and house plants is much easier and surer if coarse vermiculite is used. It does not stay too wet as may peat moss or the finer garden grade of vermiculite. Clean, sharp sand is also good but takes a little more experience to use. Coarse perlite is also used. As soon as roots on cuttings are one-half inch long, transplant to prepared soil. Again try soil, sand and peat moss, equal parts instead of the regular soil in the garden. Covering the flat or pot of cuttings with plastic, held above the tops of cuttings with a wire frame, greatly reduces care.

All sorts of plants, such as coleus, geranium, chrysanthemum, fuchsia, impatiens, bedding begonia, may be grown

from cuttings taken from indoor plants in late winter, or from garden plants in spring. The cuttings need not be more than 3- to 5- inch pieces of the ends of new shoots. Cut bottom leaves from the cuttings and set the lower half of the stem in the rooting medium. If the material is loose, press it around the stems. Water overhead when the cuttings are in place, using a fine spray.

Cuttings must be kept from wilting either by covering the container and cuttings with a sheet of plastic, or keeping them out of hot sun and drafts. A small, glass-covered box or frame, which can be shaded, is an ideal place. Leave the cuttings in the medium only long enough to root. Within two or three weeks, test a few by pulling them lightly. If they are rooted, they will not come up easily. Transplant cuttings when ready to flats, shallow boxes, individual pots of clay, plastic or pressed peat, or into a frame or nursery bed. Transfer the new plants into the garden or window boxes when weather conditions are right. ❧



A wooden flat obtained from the grocery store makes a good propagating box. Fill with peat moss and sand, water well and insert cuttings. Water again and cover flat with polyethylene, supported by wire frame.



Rooting time varies from eight to fourteen weeks or more, depending on kind of shrub and season. The evergreen azaleas shown were well rooted after a ten-week period.

PERENNIALS FROM SEED

Corinne W. Willard

GROWING perennials from seed is satisfying in several ways. Replacements for older plants in the garden can be raised from seed inexpensively and without much trouble. From a batch of seedlings you can frequently choose the colors or doubleness you seek. Moreover, it is often more challenging to grow perennials from seed than annuals. And it is one of the most enjoyable procedures of gardening! But, whatever you're starting, choose seed of the best varieties offered.

The time to start seedlings depends on the plants you will grow. For most perennials spring planting is best, in order to grow large enough plants to winter well. Following is a list of some biennials and perennials which can be started indoors in the same way as annuals (see pages 70-71), or outdoors when the soil begins to warm:

Anchusa, *arabis*, *baptisia*, basket-of-gold, *campanula* (both biennial and perennial kinds), *columbine*, *day-lilies*, *delphinium*, *doronicum*, *foxglove* (some kinds biennial), *hollyhock*, *candytuft*, *lupine*, *platycodon*, certain *poppies*, *Shasta daisy*, and *yarrow*; also biennials such as *cheiranthus* or *wallflower*, *dianthus* (*sweet William*), *English daisy*, *Ice-land poppy*, and *lunaria* (*honesty* or *moneyplant*).

Day-lilies, *gasplant* and *primulas* do well started in autumn in a coldframe. *Pansies* can be started in flats or in the coldframe at the end of July, or into September in warmer climates. In most areas they should be in the coldframe bed for the winter.

The treatment of perennial seed before planting may be more involved than opening the packet and sowing the contents. Some perennials, *Japanese iris* and *primula* for example, require a period of cool treatment before sowing. Seeds

of these should be refrigerated for 3-4 weeks. *Anchusa* requires 3-4 weeks in the freezer or the cold outdoors for best germination, although enough seedlings may be obtained from a packet for garden use without this treatment. These three perennials and *Baptisia* do well when started in the coldframe in autumn. The soil in the coldframe should be prepared as described below.

Perennials may be sown indoors in pots or trays, or outdoors in trays, pots, or in well-prepared seedling beds. Preparation of trays or pots for indoor planting should be the same as for starting annuals.

Some biennials and perennials can be started outdoors in a peat-perlite mixture in a tray, pot or flat. Sow the seeds on the moist mixture and cover lightly with peat-perlite or sphagnum moss, then label and enclose with plastic. Move the planted container to a shady place protected from birds or animals. A coldframe is practical for this purpose. It also simplifies the placement of a lath or cloth-covered shade to protect new seedbeds and emerging seedlings from the hot rays of the sun.

A prepared bed for planting perennial seeds outdoors may be worked into a corner of a vegetable garden or flower garden. Numerous seedlings can be started in a small area, although space should be planned for transplanting the seedlings before final placement in the flower border. You need a fine-textured, stone-free area into which fine peat moss or screened compost has been incorporated. If the soil has much clay, try to work in a one-inch layer of sand over a small area—at the same time the peat moss or compost is being added. If *delphiniums* or *pansies* are grown, prepare to shade the area by setting stakes to sup-

port a lath or cloth-covered shade so it will be 6-8 inches above the soil surface.

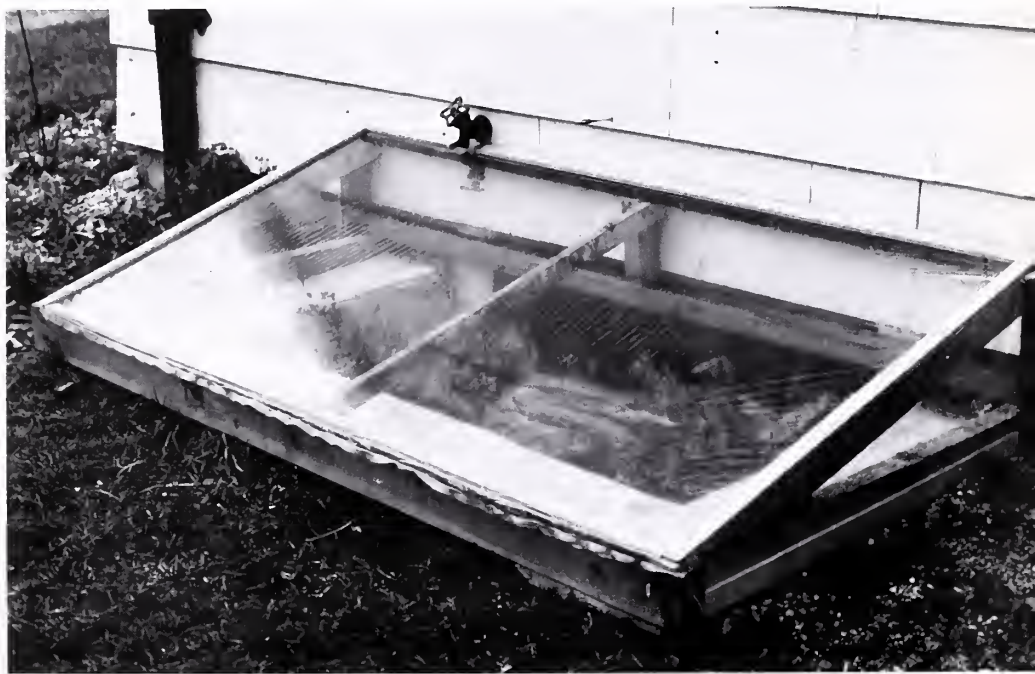
Make the planting rows an inch deep and 12-14 inches apart. Set the label before planting each packet. Sow seeds thinly and cover with half an inch of soil. Firm soil over the row by hand or with a hoe blade. Water the area and place the shade over the plants.

Some perennial seedlings, *e.g.*, delphiniums, are subject to damping-off disease, so if spring in your area is usually rainy, be sure to do all that can be done to keep air circulating around the seedlings. This is why I like to start sensitive seedlings in a garden corner instead of a cold-frame. If seedlings topple or show signs of disease, apply the systemic fungicide benomyl according to directions on the container.

When several leaves or 2 or 3 sets of

leaves have been produced by your seedlings, most genera will be ready for transplanting to a garden row for further development. Some perennials, including lupine, do not transplant well in large sizes, so move them to their places in the perennial garden as soon as the plants are 6 inches high. Using a trowel, dig straight down to loosen the soil and tap roots of the seedlings, then plant them with crowns at the same level as in the seedbed, and water well. Poppy seedlings, especially Oriental poppy, should be moved when in the dormant stage, so watch for the leaves to turn yellow before transplanting.

Some of these perennial seedlings will flower before the summer is over, but others will not flower until the following spring. Whenever they flower, you will take particular pride in them. 🌸



Herman Gantner

A coldframe is a help—but by no means necessary—in growing plants from seeds. In regions with harsh winters, such plants as those of pansies and sweet William can be packed in the frame over winter. This coldframe, a temporary structure for spring, has been built over a cellar window.

Spring gardening begins early when you

START ANNUALS INDOORS UNDER LIGHTS

Zelma Clark

BASEMENTS, dens, kitchens and extra rooms are all possibilities for starting annuals—flowering plants and vegetables, too—under lights, and fluorescent lighting is strong enough to grow sturdy seedlings.

Equipment is commonly available for adjustable heights and is often self-supported on a stand to accommodate a number of seed pans. Two-tube commercial fixtures, 24 or 48 inches long, with white or aluminum reflectors, are suitable for basement areas. They can be hung by chains or suspended on a pulley over a table or bench so that fixture height can be raised or lowered. The tubes must be quite close to the seedlings at first—3 to 4 inches. As soon as the seedlings start to grow, move them to a safer distance of 6 to 10 inches.

Clean flower pots, cottage cheese cartons, margarine containers or aluminum-foil loaf pans, all with holes punched in the bottom for drainage, are ideal for germinating seeds. A sterilized seeding medium or mix is essential. Unsterilized garden soil harbors a fungus disease known as damping-off, causing seedlings to rot at the soil line. Commercially available seeding mixes can be used, or you can mix your own using equal parts of medium grade perlite, medium vermiculite and milled sphagnum moss. These materials can be purchased at garden supply centers in small quantities as well as in bulk. Cover the mix with a layer of the milled sphagnum moss for fine seeds. Prepare seed labels with the generic and varietal names, *e.g.*, *Petunia* 'Sonata', and the date sown.

Soak containers in a sink or pan containing about 2 inches of water and allow them to remain until moisture can be

seen on top. If properly watered, the container should feel heavy. Let the container drain to remove excess water.

Gently tap out seed from the packet while moving it over the seed pan for uniform distribution. Sow fine seeds on top of the moist mix and then either press the surface gently with a finger or settle them with a mist of warm water. Larger seeds require only a light sifting of the mix to cover deep enough so that it cannot be seen. The surface should then be firmed gently to make certain the seed is in contact with the moist mix. Place the seed pan in a plastic bag propped up over the surface, and then close it. Do not cover with newspaper or black plastic.

For good germination most seeds need light and constant moisture, the latter being the most important. However, it is not likely that the seed pan will need additional water until after germination has taken place. Place pans 3 to 10 inches from tubes and keep lights on for 16 hours a day. Best germination occurs between 65 and 80° F., but a few degrees either way will give satisfactory results.

Some seeds germinate in 5 to 7 days while others may take as long as a month. Remove the seed pan from the plastic bag when the green seedling leaves are clearly visible. This will necessitate more frequent watering because a dry growing medium at this stage may mean loss of seedlings. Test the surface daily with fingertips to make sure that the mix is moist. Until the seedlings are farther along in their development it is safer to water from the bottom as before.

The second set of leaves to appear are the true leaves of the mature plant. When they are evident, start a weekly



Zelma Clark

Seeds of many plants—flowering annuals and some perennials and most vegetables are all candidates—can be started indoors under fluorescent lights.

feeding program of water-soluble fertilizer at one-quarter strength. Plants may be transplanted when one or two sets of true leaves are present. Transplant tiny seedlings to a flat or pan containing equal parts of soil, sand and peat moss, or use any of the packaged potting mixes, such as Redi-Earth or Jiffy Mix. Space them 2 inches apart. Individual seedlings may also be transplanted to small peat pots at this stage.

Always handle seedlings carefully. Lift them with the end of a wooden label, teaspoon or fork so the roots are disturbed as little as possible. Grow transplants 6 to 10 inches from the tubes and continue to feed one-quarter strength fertilizer weekly until time to set them out in the garden. At this stage, seedlings should be grown at 60-65°.

Seedlings grown under lights are tender and cannot withstand the shock of being moved directly to their places outdoors. They must be gradually accustomed to the drastic change in temperature and exposure to sun, wind and rain. This process is called "hardening off." Put them outdoors in the morning in a sheltered spot on a covered porch, under shrubs or

near foundation walls and bring them in again before evening. This introduces them slowly to the outdoor climate and gives them a chance to adjust. Do this for several days with gradual exposure to the sun. Then a day or two before planting them outside, keep them out all night. If a coldframe is used, the cover can be moved aside on warm days and kept closed when it is rainy or chilly. Flats are shallow so do not forget to water them, as they may dry quickly.

A week to ten days is necessary for hardening off seedlings. Although hardened these plants are still tender and must not be planted in the garden until all danger of frost has passed. Damaging frosts rarely occur after oak leaves have attained the size of one inch.

When the plants are ready for setting out in the open garden, water the prepared area as well as the flats or pots the day before transplanting. If possible, choose a cloudy day or the cool of evening to set out the plants. Remove plants from flats or pots carefully, lifting them out with roots intact. If they are in peat pots, break down the sides somewhat before planting. ❧

PLANTING TREES AND SHRUBS

Kenneth W. Reisch and Elton M. Smith

WOODY ornamental plants are sold in three common forms: (1) bare-root, (2) B & B (balled and burlapped) and (3) container-grown.

Bare-Root: Plants handled bare-root include many dormant shrubs, small deciduous trees, and small evergreens. These may be sold with the roots tightly packed in a moisture-retaining medium with a paper or plastic overwrap, or with the roots loosely covered by a packing medium.

B & B: Most evergreens and shrubs are commonly moved with a ball of soil. Trees with a trunk diameter over 2½ inches, measured one foot above the ground, and some smaller tree species are also balled before moving.

Soil balls are heavy since soil weighs about 100 pounds per cubic foot. Because of the heavy weight involved, professional landscape nurserymen or arborists should be hired to move large plants.

Some ornamental plants are marketed with artificial or manufactured soil balls which are processed by compressing a packing medium such as peat moss around the roots and wrapping with burlap. Since these plants are essentially the same as bare-root materials, they

should be planted as described under bare-root plants.

Container-Grown: The production of plants in containers includes the use of metal, composition, or plastic containers in which the plants are grown and sold. One advantage of this method is that the root system is undisturbed at the time of planting.

However, just as some plants wrapped in artificial soil balls are not established, neither are some types marketed in containers, and these should be labeled accordingly. Recently-potted types are not as satisfactory as established plants.

Care Before Planting

Bare-Root Plants: If you cannot plant bare-root plants soon after purchase, heel them in temporarily (plant for a short period of time by covering roots with soil in a shallow trench) and water to prevent drying of roots.

Some pruning may be necessary before planting to compensate for root loss at the time of digging. From one-fourth to one-third of the branch area can be removed by pruning back to a bud or side branch. Prune broken and damaged roots. If roots appear dry, soak them in

Drawings and text adapted from Cooperative Extension Service, Ohio State University

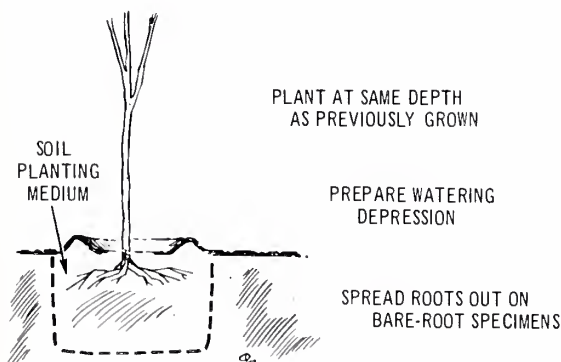


Diagram shows proper planting depth for bare-root tree or shrub. It is important to set plant at same depth as it was previously grown.

water for 30 minutes prior to planting.

B & B Plants: To prevent cracking or breaking of the soil ball, always carry B & B plants with hands under the ball or with equipment intended for this use. Carrying a plant by the stem or branches can result in a broken soil ball and a seriously damaged root system. Mulch these plants and water thoroughly if you cannot plant them soon after purchase.

Container-Grown Plants: Such plants may be left in the container for a period of time before planting. However, place them in a sheltered location and water frequently and thoroughly. Most types of containers that will not deteriorate readily when placed in the soil should be removed before planting. Since metal containers may be difficult to remove, ask the nurseryman or garden store operator to cut the sides of the can at the time of purchase.

When to Plant

The usual planting seasons are spring and fall. However, container-grown plants and some B & B stock can be moved anytime during the growing season, providing you follow proper watering practices.

Bare-root dormant material should be planted only while the plant is dormant, either in early spring or in the fall after leaf drop. This type of material should not be purchased and planted after new shoot growth has extended beyond 2 to 3 inches.

Plant hard-to-transplant ornamentals in the spring, preferably with a soil ball to assure the longest possible period for the establishment of new roots. These plants include beech, magnolia, rhododendron, azalea, flowering dogwood, Japanese maple, holly, sweet-gum, hemlock, tupelo and sourwood.

The planting season can be extended by careful handling of plants and the use of foliar sprays to reduce transpiration (water loss). A number of anti-desiccant sprays are on the market. They are formulated with either a latex or polyethylene-type base. Use of these sprays improves transplanting success with some

plant types. For example, some shade trees can be moved while in full leaf with a ball of soil, use of an anti-desiccant, and careful handling. However, the full leaf season is not the normal time to plant trees.

Preparing the Site and Planting

Dig the planting hole deep enough to set the plant at the same depth it originally grew. This depth can be considered as the top of the soil ball, or it can be determined by the soil line usually evident on the stems of bare-root material. Deeper planting, especially in heavy soil, may cause root dieback and eventual loss of the plant.

If good topsoil is present at the site, separate it from the subsoil and save for reuse. Placing the soil on a plastic or canvas sheet facilitates easier clean-up when planting is completed. Discard the subsoil.

For bare-root plants, dig the hole wide enough so you can spread the roots out to full length. Make the hole for B & B or container-grown plants 2 feet wider than the soil ball or container to permit sufficient backfill with good planting soil. Soil to be placed in the hole around the roots or soil ball should provide the best possible conditions for new root growth. Topsoil alone is usually not sufficient. Add some form of organic matter at the rate of one-third of the volume of soil replaced in the hole.

There are many sources of organic matter, including coarse sphagnum peat moss, sawdust, leaf mold, and compost. Peat moss is the most readily available and widely used type.

It will be necessary to use additional nitrogen during the growing season if sawdust or other quickly decomposable materials are added, since nitrogen is "tied up" through the decomposition process and is unavailable to the plant. With acid soil plants such as rhododendron, mix acid peat moss with the fill soil at a rate of 50 per cent or more by volume.

Always handle plants carefully. Lower B & B and container-grown plants into

the hole slowly to prevent breaking or cracking of the soil about the roots. Guard against bruising or breaking the roots of bare-root material.

Poor drainage accounts for more losses in transplanting than any other single factor. In poorly drained soils, install tile drains under the bed areas and under or adjacent to large tree planting sites. Where groups of plants are planted, the effect of poorly drained soils can be overcome by forming raised beds of a well-drained medium on top of the ground.

Bare-Root Plants: When planting bare-root plants, place some of the prepared fill soil in the base of the hole prior to planting. Then place the plant in the hole at the same depth as it was growing previously, or higher in heavy soils. Straighten the roots out to prevent crowding or doubling under. Remove roots which are damaged or which later may encircle and girdle the main roots or stem.

Work the prepared soil around the roots carefully so that no large air pockets remain. Gently raising and lowering the plant will help settle the soil. If necessary, firm the soil lightly. Do not compact it with heavy packing.

Fill the hole with soil and then water thoroughly. Leave a saucer-shaped depression around the plant to contain later water applications.

B & B and Container-Grown Plants: Locate the plant in the hole with the top of the soil ball level with or above the surrounding soil surface. If soil in the bottom of the hole is loose, place the plant higher to allow for settling. High planting is especially important in heavy soils. Work the prepared fill soil firmly around the soil ball but do not compact it. Follow the same procedure as described for bare-root material, leaving a depression for later watering. Be sure the edge of the saucer-shaped depression, left for water retention, is established inside the area above the outer edge of the soil ball. Then when water is applied later it will soak into the root area rather than around the outside of the ball.

Before planting, remove plants from containers made of metal, plastic, or other material which will not decompose in a short time. The burlap on B & B plants can be left on, but it should be loosened and rolled back so that it will not be exposed after the plant is set in the hole.

Fertilizing: Small amounts of fertilizer may be added to the fill soil when planting. Since nitrogen and potassium move readily in the soil, it is not so important to add these at planting time; however, phosphorous is relatively slow moving. It can be added as superphosphate, especially around larger plants. The recommended rate for adding superphosphate or a low-nitrogen fertilizer, such as 4-12-4 or 5-10-5, is one measuring cup ($\frac{1}{2}$ pint) per bushel of soil. Farm manures may be incorporated at planting time; however, use of fresh material can result in damage to roots. Commercially processed or partially decomposed manures are safe to use. **NOTE: Excessive use of readily available nitrogenous fertilizer around plant roots can cause serious injury and may result in death to the plant.**

Care After Planting

Watering: Lack of sufficient water during the first growing season is a major cause of plant loss. The limited root system on these plants makes them highly susceptible to dry weather damage. Supplemental watering is absolutely necessary.

Wet the soil thoroughly enough to soak through to the base of the root system at each watering. Water the plants twice a week during hot weather unless there is at least one inch of rainfall per week or 10 days. Determine the amount of soil moisture by taking a soil sample at a depth of 6 or 7 inches. Squeeze a handful of the soil, and if the soil ball holds together when released but is not sticky, soil moisture is favorable. If it appears dry, the plant needs water. Light surface waterings are of little benefit.

Mulching: Leave the area over the plant roots open (free of sod) for the

first year or more. Cover the soil with a mulch. A 3- to 4-inch mulch will conserve moisture, reduce weed growth, maintain a more uniform temperature, prevent surface crusting, and improve the appearance of the area.

Compost, ground bark, and other similar materials provide an excellent mulch cover. Apply mulch at once on plants put out in the fall. It should not be applied following early spring planting (March or early April) until the soil has warmed up. Leaving the soil uncovered at this time will enhance new root growth.

Wrapping: Wrapping trunks and larger branches of newly planted trees reduces water loss and damage from sun scald. This practice also provides partial protection from borers. Apply burlap or special tree wrapping paper neatly. Start at the lower branches and wrap downward around the trunk in a spiral fashion. Overlap the covering to give added protection. Reinforce the wrapping by binding with twine.

Leave the wrapping on the tree for

two years unless it becomes unsightly.

Remove Labels: Always remove labels attached to the plant by heavy cord or wire. Cord or wire can cause constriction of the branch as it grows in diameter. This often results in severe injury.

Staking or Guying: Most trees over one inch in diameter should be supported by a stake or guy wire. This keeps the plant in an upright position and prevents roots becoming loose or damaged.

Trees up to 2 inches in diameter can be supported by a stake 2-by-2 inches by 8 feet driven firmly into the ground close to the trunk. Attach the tree to the stake by a loop of soft rope, burlap strip, a wire run through a piece of garden hose, or plastic types that have been designed for this purpose.

Never fasten the tree with wire alone.

Trees 2 to 3 inches in diameter should be supported by two or three stakes. Trees of larger sizes require guy wires attached to lag hooks in the trunk or through garden hose around the lower branches. ❁

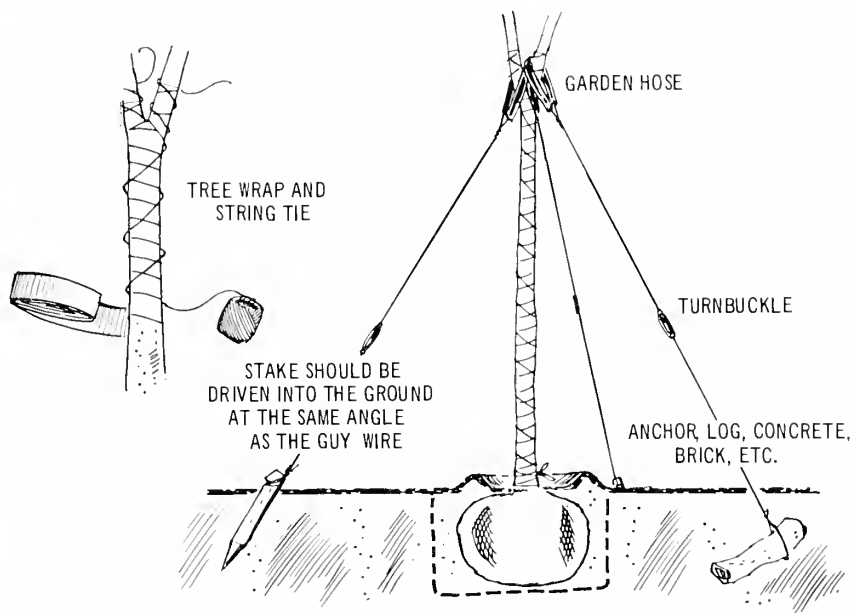


Diagram shows technique of wrapping newly-set tree to protect bark, planting of balled-and-burlapped tree, and how to set up guy wires for its support. A single stake is usually sufficient for smaller, sturdy trees.

PRUNING ORNAMENTAL PLANTS

Kenneth W. Reisch

PRUNING consists of the removal of a plant part or parts to improve the health, appearance or usefulness of the plant. Pruning provides the means of preventing, correcting or improving undesirable growth. But, failure to use recommended techniques often leads to damaging a tree or shrub. For instance, there are some who feel that unless a large brush pile is created, the job is unfinished. At the other extreme, there are those who feel that a plant will be damaged if even the necessary amount of pruning is done.

In order to prune correctly, consideration should be given to such factors as the rate and habit of the plant's growth, specific pruning techniques recommended for the plant, and the desired end result.

Pruning is work, and the trend in modern gardening appears to be toward a reduction in maintenance. The necessity for pruning can be considerably reduced by selecting the proper tree or shrub for the location. Those which are not entirely hardy, or which will grow too large for the location, or tend to be vigorous and become quickly overgrown, or are inclined to have a lot of dead wood or become unsightly with age, should be kept to a minimum in the landscape plan. The wide availability of many plant types in nurseries today has enabled the home owner to consider these factors when buying plants. Thus, proper selection of trees and shrubs can minimize the need for pruning.

Here are some reasons for pruning:

1. To maintain the natural shape of the plant.
2. To maintain or limit the size of a plant so that it doesn't grow out-of-bounds.
3. To remove undesirable growth that would detract from the plant.
4. To remove broken, unsightly, diseased, or insect damaged growth.
5. To develop a particular form such

as an espalier or hedge.

6. To produce compact growth and prevent legginess.
7. To promote new growth, particularly in older shrubs.
8. To improve future flowering and/or fruiting by removing old flowers or fruit.
9. To improve the chances of survival at transplanting time.
10. To maintain the maximum coloration on those plants selected for twig or stem color.
11. To improve or maintain flowering by removing some branches which would allow light to penetrate to the interior of the plant.
12. To direct or correct the growth in shade trees to avoid problems later on, such as eliminating weak crotches or poor branch structures.
13. To remove suckers and/or water sprouts.
14. To rejuvenate old, declining plants by removing older wood so young growth can develop.
15. To increase safety to humans or property under trees by removing large branches that are weak or broken

The proper time of pruning is often a question and, in general, from the standpoint of plant growth, pruning can be done at practically any time of year. However, one must consider such factors as food supply, flowering period and winter hardiness. The operation can be harmful if new growth is removed in the spring. A deciduous plant manufactures food during the growing season which is stored in various forms in roots and stems over winter. This food is the reserve energy supply for new growth and if the growth is removed before new food can be produced, growth may be stunted for the season.

With most plants, the ideal time to

prune is during the dormant season before new growth starts. Some flowering shrubs are exceptions and this is indicated under the shrub pruning section.

The method of making pruning cuts is of great importance. Most rapid healing of a wound occurs when the cuts are made flush with the adjoining branch. When even small stubs are left, healing is prevented, the stubs die back and disease and rot organisms gain entry to healthy tissue. The same problem occurs when branches are broken instead of cut off. Cuts of terminal shoots should be made just above a bud.

Proper care should be given to large pruning cuts or bark injury to facilitate healing. The wounds should be shaped by carving to a point at top and bottom and all wounds larger than one inch in diameter should be covered with a tree wound dressing. House paints or paints with a lead base should never be used. "Tree paint" is available from all good suppliers to the horticultural trade.

The general procedure to use in pruning any plant is to follow this schedule.

1. Remove dead, broken, and disease- or insect-infested branches.
2. Remove branches which cross or or are detrimental to the shape and appearance of the plant.
3. Use the pruning procedures specified under the plant types that follow.

Specific procedures for pruning different types of plants are outlined under the following headings.

Pruning Established Plants

Shade Trees

1. Remove branches interfering with foot or vehicular traffic.
2. Thin out top to open internal branches to light.
3. Do not cut central leader unless absolutely necessary.
4. If possible, it is better to make two small rather than one large cut.
5. Call in a recognized arborist for work in high places—the chances are that you are neither trained nor

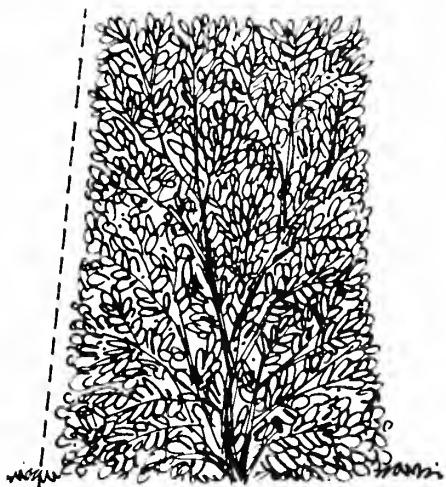


Fig. 1 Prune a hedge so its base is broader than top to allow light to reach lower parts. Prune once or twice a year.

conditioned to do high pruning.

6. To prevent tearing bark, cut any large branches in two or three cuts beyond final cut to reduce weight.

Flowering Trees

1. Prune after flowering.
2. Follow recommendations indicated under shade trees.
3. Thinning the top will increase flowering; however, a heavy cut-back may reduce or eliminate flowers for a season.

Shrubs

1. Don't simply trim back top, thin out plant by cutting older branches back to the ground. (Fig. 3)
2. Prune often and reduce necessity of heavy cut back.
3. Some shrubs such as forsythia, mock-orange, deutzia, and spirea can be cut back to the ground when it is necessary to rejuvenate old plants that have grown too large or are mostly "old wood."
4. In order to retain flower buds on early spring flowering shrubs, such as forsythia, lilac, mock-orange and



Fig. 2 It is difficult to prune firethorn without eliminating last year's fruits or next year's flowers and fruits. Annual, light pruning insures some flowers and fruits each year.

garland spirea, prune shortly after flowering.

5. On shrubs with colored twigs, such as red and yellow-twig dogwood, about one-third of the older wood should be removed every year to retain maximum coloration.
6. Remove old flowers of shrubs such as lilac, rhododendron, hibiscus and magnolia to maintain optimum flowering for the next season.

Narrowleaf Evergreens

1. With the exception of pines, most narrowleaf evergreens should be cut back the desired amount in early spring, prior to growth.
2. When branches are cut back hard, leave some foliage on the remaining part. One exception to this is yew which will grow from a severe cut-back, though this is not generally recommended because the plants will be unsightly for two or three years.
3. Pines are "thickened up" by pinch-off part of each new shoot, the "candle" growth which comes from the buds at the beginning of the growing season.
4. Yearly pruning is required in order to maintain a compact habit.
5. It is common practice to shear evergreens with a hedge shear and thus obtain a severe, formal plant. More interesting, semi-formal plants can

obtained by pruning individual branches with hand shears.

6. Evergreens should be occasionally thinned out to open inner branches to light.

Broadleaf Evergreens

1. Relatively little pruning is necessary with plants of this type with the exception of rules 1 and 2 under general pruning.

A plant that deserves special attention is pyracantha or firethorn. Many gardeners feel there is really no good time to prune this plant. The flowers for the next year are produced on the previous season's growth.

If the plant is quite large or overgrown, then the best time of the year to prune is in the late winter when dormant. This practice will eliminate most or all of the flowers for the next spring, depending on how severely the plant is cut back. When a light pruning is required, winter is still the proper time. If careful when pruning these branches, enough of last year's growth can be left to insure flowering for the current year, as shown in Fig. 2. Pruning pyracantha in the summer reduces or eliminates fruiting in the fall, depending on how severely the plant is pruned. Pyracantha pruned severely at any time of the year reduces flowers and fruits, therefore, prune lightly every year rather than extensively every several years.

Fig. 3 Light shaded branches and dotted lines show how deciduous shrubs are to be thinned. Thinning is cutting off a branch where it is attached to the trunk or a main stem.



Vines and Ground Covers

1. Some deciduous vines require occasional heavy pruning or complete cutback.
2. Prune vines to keep them out of windows or other similar areas on structures.
3. Ground covers may require pruning to keep them within bounds or to rejuvenate plantings.
4. Little pruning is necessary on many of the evergreen ground covers. Exceptions are some kinds of euonymus, English ivy, spurge, and creeping mahonia.

Roses

1. Follow rules 1 and 2 under general pruning recommendations.
2. Cut remaining canes back to 18 to 24 inches in height.
3. Prune hybrid teas, floribundas, polyanthas and grandifloras prior to growth in the spring.
4. Prune climbers after flowering.

Hedges

1. Prune prior to growth in spring and again in summer to remove feathery new growth.
2. Prune annually to retain size and shape.
3. Prune to shape so that base of hedge is wider than the top. This

allows light to reach the lower branches and prevents legginess. (Fig. 1)

Pruning Plants for New Plantings—Shade Trees

1. When moving bare-root, prune broken and dead roots and cut back tops in proportion to the size of the root system.
2. When pruning the top, cut back lateral branches, not the terminal.
3. When moved with a ball of soil, only light top pruning is necessary or desirable.
4. Remove weak, V-shaped crotches when tree is young.

Shrubs

1. When moved bare-root, remove dead or broken roots, and cut back branches.

Evergreens

1. All evergreens should be moved with a ball of soil. Little or no top pruning is necessary.

Roses

1. Prune dead or broken roots.
2. Cut top back to 10- or 15-inch height.
3. Remove thin, spindly or crossing shoots. ✂

GARDEN PROBLEMS OF TREES AND SHRUBS

S. S. Hagar

To control garden problems you must first know the cause. Sometimes the signs of harmful insects or other pests are easy to see, but often not. When the cause is unclear, help can usually be obtained from arborists, botanic gardens or cooperative extension agents. Bear in mind that it is most difficult for a professional to diagnose maladies without seeing the pests, plant symptoms, or, in some cases, without having soil or leaf analyses.

Causes of Trouble

Apart from insect pests and fungi, viruses or other pathogens that cause diseases, there are many disorders caused by cultural factors that new gardeners often mistake for disease. Let's begin with them.

Soil Nutrients One of the immediate questions to ask yourself if a plant is suffering is whether too little or too much fertilizer has been added. The first may result in stunted growth and yellowed leaves, the second may cause root burning and leaf scorching. Note, particularly, that it is usually not necessary or desirable to fertilize trees or shrubs the first year after transplanting; give the roots a chance to grow.

"Acid-loving" plants, *e.g.*, rhododendrons, azaleas and other members of the Heath Family, will have yellowish leaves and few flowers if the soil is not sufficiently acid. Too much acid in the soil may stunt plants. Conversely, if the pH is too high, resulting in alkaline soil, iron is not available to these plants and new leaves become yellow between the veins. To correct the former, liming is necessary while the latter type of soil should have iron chelate added. Soil pH can

be determined by using a simple commercial pH kit or sending samples to your Agricultural Experiment Station. Most of the common trees and shrubs are tolerant of a fairly wide pH range.

Soil Moisture A deficiency usually occurs in the compacted soil of urban areas. One symptom is leaf scorch (browning around the margin of the leaf), which commonly affects dogwood, maple, beech and horse-chestnut. Watering may be necessary, or the use of an anti-desiccant spray to protect leaves. Excesses of water can cause corky swellings, called oedema, to develop on leaves and twigs, as often occurs with yew. Good drainage is important for most kinds of trees and shrubs. If it is not available, installations of tiles or relocation of plants may be necessary.

Light The majority of trees and shrubs require good light for proper growth and flowering but some, including cornelian-cherry, dogwood and witch-hazel, thrive in partial shade. Study the light in your garden before choosing the kinds of plants to grow. If there is a fair degree of shade, bear in mind that many broad-leaved evergreens will perform well in these conditions. (Consult BBG Handbooks No. 22, 61 and 66 for more detailed information.)

Climate Select plants that are adapted to local growing conditions. Others may grow temporarily but usually do not mature. For example, no one would grow palms, citrus or avocados outdoors in Massachusetts! Most good tree and shrub books have hardiness zone maps with plants keyed to their appropriate zones. Also, check with a local nursery or garden center if in doubt about a plant's ability to survive winters in your area.

Low temperatures, of course, can injure or kill plants, depending on their genetic make-up, site and other factors. Sudden drops to freezing or below may result in blackening, wilting or death of tender twigs and leaves of deciduous trees, or reddening of needles and defoliation of conifers. A cool summer followed by a warm, rainy autumn prolongs the growing season. Twigs, buds and branches fail to harden off and are easily damaged by early autumn frosts or low winter temperatures. Sometimes, spring-flowering plants such as dogwood, rhododendrons and magnolias fail to bloom due to bud damage in the previous season. Another problem is alternate freezing and thawing, which can cause frost cracks in thin-barked trees, especially flowering cherry, linden, Norway maple and horse-chestnut. Newly planted trees with thin bark should have the trunks wrapped with burlap or paper.

Wind Broad-leaved evergreens and some hemlocks may be dried by winter winds, causing a scorch around leaf margins. The corners of houses, wind-exposed hilltops and open spaces are likely places for this to occur. Damage is usually more severe on young plants. Much of this damage can be prevented by constructing windbreaks, proper positioning of plants, or spraying leaves with an anti-desiccant on a mild day. In addition, before the soil freezes in autumn, thoroughly water roots of susceptible evergreens; repeat in winter or early spring when the soil is not frozen.

Chemicals Salt run-off from either sodium or calcium chloride weakens roots and burns the leaves of trees and shrubs located along sidewalks and streets. Overdoses of pesticides may damage foliage, too. When the air temperature is 85° F. or above, dusts and sprays can be harmful to some plants; sulfur, for example, causes black spots and defoliation of viburnum. For this reason, viburnum should not be planted close to roses that are frequently sprayed with sulfur compounds.

Another problem is unwise or careless use of herbicides such as 2,4-D. Drift



H. D. Hudson Manufacturing Co.

Practical for the home gardener who has small trees and only sprays occasionally is the bucket-type sprayer shown here.

from these chemicals will cause abnormal growth and stunting of the leaves of certain trees and shrubs. Herbicides should be applied with the greatest of care and only on a calm day. In addition, spray tanks used to apply herbicides should not be used to apply insecticides or fungicides. (See BBG Handbook No. 73 for information on herbicides.)

Air pollutants, particularly ozone and sulfur dioxide, can cause serious damage on some trees, shrubs and garden flowers. Insect injury may mimic some air pollution symptoms, *e.g.*, stippling of upper leaf surfaces. An expert should be consulted to verify possible air pollution injury.

Insect and Related Pests

Insects are often visible, but mites are difficult to see on the foliage. Holes in leaves might indicate the presence of slugs, stems chewed off at ground level could be caused by cutworms that hide in the soil or mulch by day, and sculptured, eaten edges of ericaceous plants are probably the work of black vine weevils.

Most pests can be divided into three classes: (1) those that suck juices from plants, (2) those that chew tissues and (3) those that bore and chew tissues.

The first category includes, but is not limited to, white flies, aphids, mites, scales, mealybugs, lacebugs, midges, thrips, leafhoppers and psyllids. (Consult the *BBG Handbook on Garden Pests* for descriptions.) These pests can usually be controlled by timely applications of malathion, Sevin or Cygon, a systemic. (Cygon is harmful to some plants.) Kelthane, Pentac or Aramite will control mites. White flies are more effectively curbed by spraying with Resmethrin or White Fly Spray.

Dormant oil, applied in late spring just before bud break, will also control many of these overwintering pests. Dormant oil spraying should be done on a dry, mild, sunny morning. Do not use it on sugar maple, Japanese maple, beech, hickory, walnut, Douglas-fir, blue spruce, butternut or birch.

The second category includes larvae of moths and butterflies; Japanese beetles, rose chafers, adult sawflies, elm-leaf beetles, taxus weevil, black vine weevil and others. Many chewing insects can be controlled with Sevin or methoxychlor (caution: excessive use causes a mite buildup). Taxus weevils and closely related genera are more effectively controlled by spraying with chlordane (where permitted) and drenching the root system to kill larvae.

The last category includes bark beetles, borers (rhododendron, lilac, dogwood), and larvae of sawflies and flies. Some compounds used are the systemics such as Cygon and Meta-Systox R. These are applied as full-coverage sprays to control leaf miners as well as scales, mites and white flies. Methoxychlor or Thiodan is often used as a spray to prevent entry of bark beetles and borers. Applications are made three times in spring at 20-day intervals.

Fungal Diseases

Some pathogens (agents that incite disease) cause leaf spots; others cause wilting, root rots, twig blights, cankers and "anthracnose" diseases. Anthracnose is characterized by lesions that affect a limited area, necrosis and hypoplasia

(cell division rate is lower than normal). Leaf spots are usually easy to see, as are some cankers (dead, patchy areas in wood), but wilting, blights and anthracnose diseases are often mimicked by symptoms of poor growing conditions—for example, lack of water can cause wilting.

Leaf spots and anthracnose can be prevented from spreading by spraying with Captan, Zineb, Maneb or fixed coppers in spring. (Be careful using Bordeaux or other copper sprays on some species of *Prunus*; these compounds may be harmful.) Canker fungi are usually weak parasites that enter natural openings or injured tissue. If trees are not growing vigorously they are more susceptible. Dead areas should be pruned to sound wood. The same holds true for twig-blight fungi.

There are no adequate controls for root rots caused by *Armillaria mella* or *Phytophthora* spp. These fungi, which live in the soil, attack trees or shrubs in weakened condition. Wilts are often caused by *Fusarium*, *Verticillium*, *Cephalosporium* or *Ceratocytis* (the latter is the deadly Dutch-elm disease fungus). To properly diagnose this problem, laboratory cultures of these fungi are required.

Viruses and Bacterial Diseases

A common symptom of virus infection is the stunting of plants. In addition, viruses may cause ringspots on leaves, vein clearing, vein banding, mosaic patterns, mottle, curling and line patterns. Viruses are usually transmitted from plant to plant by aphids and leafhoppers, but they can also be carried by nematodes in the soil or through root grafts. People who smoke should wash their hands before handling plant material since tobacco mosaic virus, which infects many plants, can be transmitted from cigarette tobacco in this way. There is no cure for virus-infected plants at the present time. Keeping aphids and leafhoppers under control and using virus-free stock are the best control measures.

The two most common bacterial diseases are fireblight and crown gall. Fire-

blight attacks many plants of the Rose Family, especially *Prunus*, *Pyracantha* and *Cotoneaster*. The flowers turn brownish-black and droop in a shepherd-crook fashion. Bacterial ooze forms on twig cankers. Agrimycin is often used to help control or prevent further spread of the disease. Cankered areas should be promptly removed. Fertilizers, especially those high in nitrogen, should not be applied to affected trees. Crown gall usually forms at the root crown of plants and consists of wart-like growths of tissue. Roses and *Euonymus* are quite susceptible but infected plants are seldom killed. Galls can be treated by applying a 0.92% paste of Bacitacin.

Pest Control Equipment and Spraying

Equipment Various kinds are available including aerosol cans, hand sprayers, compressed-air sprayers, knapsack sprayers, trombone sprayers and dusters. Aerosols are useful for spot treatment. The spray should be applied 12-18 inches from the plant. Small atomizer-type hand sprayers usually hold one quart and are also handy for spot treatment.

The compressed-air sprayer holds from 1-5 gallons and will take care of most small trees and shrubs. It must be pumped and the contents agitated. Some are mounted while others have straps for carrying over the shoulder. Knapsack sprayers are carried on one's back but no pumping is required; they are powered by a gas engine. They are sometimes used to spray dormant oil on small trees. The trombone sprayer is pumped by hand and is useful for one or two large trees. The spray material is drawn from a pail. The wheelbarrow sprayer is a manually operated hydraulic sprayer mounted on a frame on wheels; it holds ten or more gallons and is primarily for larger gardens. Dusters range from a rubber-bulb size to midget rotary dusters. One should have an extension tube with the latter. Bellows dusters and knapsack, crank-operated dusters are also available.

For large trees, spraying should be done by an arborist. For small trees and

shrubs, the compressed-air sprayer is probably the best. An excellent duster is a rotary, hand-operated type with an extension tube. The size of the garden, type of plantings and personal preference dictate the best equipment for the job at hand.

Types of Pesticides, Mixing and Handling Pesticides are in the form of granules, wettable powders, emulsifiable concentrates and dusts. Granules such as Di-syston and Temik are applied around the base of plants, then scratched into the soil and thoroughly watered in. Rates vary from 1 to 2.5 oz. per inch of trunk diameter measured at about 3 feet from the ground. Dusts are not as effective as sprays for insect control on ornamentals, but they can be used where a long-lasting residue is not required. Dusts are easily washed off plants by rain or removed by strong winds.

Wettable powders are the most common pesticides used. They are safer than emulsions because inert diluents are added. They form a white residue on leaves. For hard-to-wet foliage (rhododendron, camellia, mountain-laurel) add a spreader-sticker, such as Triton or similar material, to distribute the particles uniformly and make them adhere. Constant agitation in the spray tank is necessary when using wettable powders.

Emulsifiable concentrates have the advantage of long-lasting residual deposits; they resist washing off by rain. Some of the organic solvents may cause plant injury. If in doubt, use only a small amount on a trial basis. A xylene-type solvent is safest for most plants. Never use broken emulsions, ones that are oily on top. A good emulsion spray will be evenly and lightly milky-white throughout.

The amount to apply per plant will vary depending on the pesticide used. These instructions are printed on labels. Some tips are: (1) when spraying leaves, spray until runoff occurs at the tips; (2) make sure there is thorough coverage, especially on new leaves; (3) do not overspray, this may harm leaves, and

(4) if dormant oil is used to control overwintering pests, thorough coverage of twigs, branches and trunk is essential.

Mixing Follow the label directions and add no more pesticide than stated. When starting, add the required amount of pesticide to a small amount of water and mix thoroughly in a container. If a spreader-sticker is used, add at this point. Pour contents into spray tank and add proper amount of water. Agitate before and during spraying. If using Bordeaux mixture, use only fresh material. You also *should not*:

1. Add dusts to wettable powders for a mixture.
2. Use materials that are incompatible. For example, Bordeaux mixture should not be mixed with lime-sulfur. When mixing multi-purpose sprays, *e.g.*, those containing an insecticide-fungicide-miticide, make sure the components are compatible. This information can be obtained from your extension agent.

A frequently used multi-purpose spray for insects and diseases consists of the following mixed in one gallon of water. Only wettable powders (WP) are used.

Carbaryl (Sevin)	50% WP	2 T.
Kelthane	35% WP	1½ tsp.
Malathion	25% WP	4 T.
Zineb	65% WP	1 T.

On roses, substitute 4 tsp. Phaltan for Zineb to control black spot. If mildew is a problem, add 2 tsp. Karathane (Mildex). Other multi-purpose commercial sprays are available at nurseries and garden centers.

Handling of Pesticides The following are some general precautions when applying pesticides in home gardens:

1. Read the *entire* label and *follow the directions*.
2. Do not contaminate edible plants with spray drift or drip.
3. Store pesticides in closed, labeled containers in a cool, dry place out of children's reach, and away from pets and birds.
4. Avoid accidents. If a pesticide is

spilled on the skin, wash thoroughly with soap. If you swallow any pesticide, spill in your eyes, or absorb or inhale it, call a doctor immediately. Clothing should be changed promptly if wetted by pesticides. Wash clothing after use. Wear protective garb if the label calls for it.

5. Empty cartons should be buried. Punch holes in cans or drums. Avoid contamination of streams and ponds. (States often have different requirements for pesticide disposal. Check with your extension agent.)
6. Mix only enough pesticide for the job; excesses can be sprayed on alternate targets if necessary. Do not pour any excess down sinks or other drains.
7. Spray only when temperature is below 85° F. Do not use dormant oil when the temperature is 45° F. or lower. Do not dust or spray when plants are wilted.
8. Wash sprayer thoroughly after use: some materials are corrosive.
9. Emergency first-aid directions and telephone number of the nearest poison-control center should be posted.
10. Buy only as much pesticide as you plan to use in the gardening season; many don't keep well.

Finally, the home gardener should realize that some plants are prone to attack by certain pests or pathogens. Examples are: some lilacs and roses—powdery mildew; horse-chestnut—leaf blight; roses—black spot, Japanese beetles and rose chafers; lindens—leafhoppers; ericaceous plants—lace bugs; flowering cherries, peaches, plums and crabapples—scale and/or borers; rhododendrons, dogwoods and lilacs—borers; yews—mealy bugs and weevils. Spraying programs should be planned accordingly. Timing of sprays depends largely on weather conditions and the life cycle of the pest or pathogen. However, with a little effort and proper spraying, most garden troubles can be kept under control. ☞

LAWNS AND THEIR TENDING

Robert W. Schery

ALTHOUGH the requisites for fulfilling plant growth—sunlight, fertile soil and moisture—are the same for lawn grasses as for garden plants, a lawn is in some ways untypical. The aim, of course, is rich, dense foliage, not flowers or fruit. Also, the most attractive lawns are so densely packed that the plants restrain and dwarf one another, in some cases to the extent that individuals barely hang on and require succor to counter seasonal stress. For best performance lawns must be regularly tended.

On the bright side, hordes of new grass varieties (cultivars) have been bred especially for lawn conditions. On the whole they are lower growing, suffering less from close clipping than did old-fashioned sorts. They are mostly tolerant of the more serious diseases, thus withstanding forced growth and are very attractive.

The Major Lawn Grasses

Although innumerable ground-hugging plants can be used for lawns, grasses have generally proved best, one exception being *Dichondra*, a low-growing morning-glory relative often used in southern California. The growing point (meristem) of turf grasses is basal and not destroyed by mowing; the grass produces new tissue from below constantly. Many specialty grasses fit particular niches, including buffalograss (*Buchloë*) in the dry, mid-continent plains where watering is impractical; salt-tolerant species such as *Distichlis* and *Puccinellia* for alkali seeps and salted berms; and carpetgrass (*Axonopus*) for soggy soil of the southeastern coastal plain. However, four northern species (1-4 on following list) and five southern ones (5-9) bear most of the lawn-making burden in the United States:

1. Kentucky bluegrass (*Poa pratensis*)—a superlative sod-forming kind spreading by rhizomes; durable and

recuperative, widely adapted and requiring only moderate care; many elegant cultivars.

2. Perennial ryegrass (*Lolium perenne*)—a non-spreading bunchgrass but available in fine new turf-type cultivars as good looking and almost as hardy as bluegrass; quick to sprout and provide cover.
3. Red fescue (*Festuca rubra*)—beautifully fine-textured, often spreading moderately by rhizomes, but not well adapted to humid heat; a "poor-soil" species, doing well on infertile ground and dry shade; several improved cultivars.
4. Bentgrasses (*Agrostis*)—spread by above-ground stems (stolons), require extra mowing and frequent thatch removal. Colonial types, such as 'Highland', are not demanding except for regular mowing; perhaps the most elegantly textured of all turfgrasses, and well adapted to humid climates.
5. Bermudagrass (*Cynodon dactylon*)—sometimes called bentgrass of the South; very attractive, especially the vegetative cultivars, when well tended; fast growing and aggressive, needing special care; spreads by runners; can't stand shade; seed for common type only.
6. Zoysia (*Zoysia*)—general habit and appearance of Bermuda but much slower growing and tedious to establish; very tough and wearing on mowers; thatch can cause an almost impervious layer; no seed of improved cultivars.
7. St. Augustine (*Stenotaphrum secundatum*)—coarser than most but highly useful in Deep South; has many problems, often subject to thatch, but inexpensive as sod; spreads quickly by runners and tolerates shade; not grown from seed.

8. Centipede (*Eremochloa ophiuroides*) —a medium-textured, spreading species, attractive but temperamental, not doing well in fertile and alkaline soils; seed or vegetative starts; low maintenance.
9. Bahiagrass (*Paspalum notatum*) —fairly open, medium texture, spreading by runners; hardly elegant but adapts to low maintenance and is available as seed.

Preparation and Seeding

When planting a lawn, give these grasses the best possible soil in the very beginning. Not much can be done for the root-zone once the lawn is established, but cultivation before planting affords a great opportunity. Mixing in ample fertilizer—and lime, separately, if needed (be guided by a soil test if you are unfamiliar with your soil's characteristics)—is a sound practice. Renovation, which includes surface sowing, is possible but has less likelihood of complete success. In this method, the soil is scarified with powered equipment (power rakes, turf thinners) which slices through the old turf layer and slightly into the ground, making a seed-bed of sorts. Renovation is generally more successful if the old vegetation is first killed chemically.

Soils of the humid eastern states usually benefit from liming, which is appropriate if pH is much below 6. Almost all soilbeds profit from the mixing-in of phosphatic fertilizer, since phosphorus generally fixes to soil particles and descends only slowly into the rootzone from later applications to the growing lawn. Many soils can be more crumbly and better-structured by mixing in organic amendments, though this has become expensive and most people rely upon fertilization to encourage good root growth, thus letting the grass make the topsoil improvements through the seasonal turnover of dispersed rootlets.

Soil preparation should be equally as thorough whether the lawn is to be seeded or sodded. Sod will not flourish if it cannot root immediately into a loose soilbed free from obstructive layering,

such as might be caused by thatch or soil strata of differing texture. Give the soil of a sodded lawn just as much attention as if it were to be seeded.

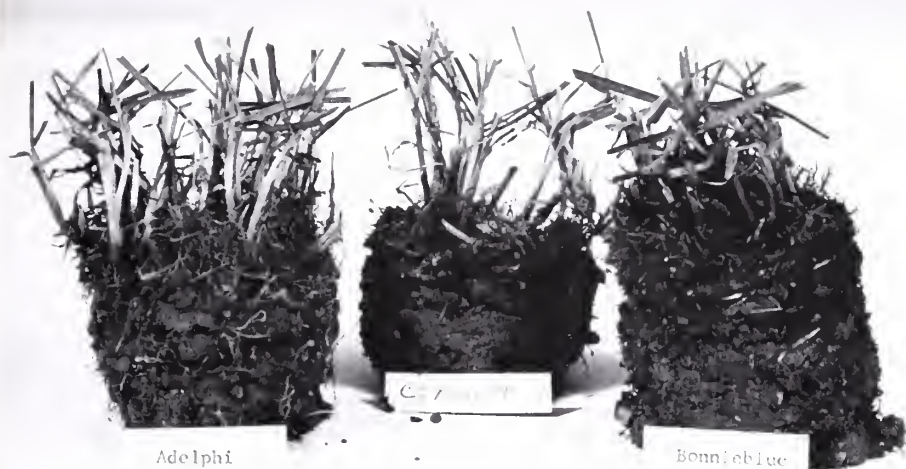
A seedbed is most accurately sown with a mechanical spreader. But whether by hand or machine, sowing half the seed in one direction, the other half at right angles, better assures against vacant spots. The loose, chunky surface of cultivated ground accepts seed nicely; the seed will be well situated for sprouting in the humid "miniature canyons" between soil aggregates. Mulch—a light, protective covering provided by straw, loosely woven burlap, stringy sphagnum or pine boughs—helps get the planting off to a fast start. Mulches not only protect against washing but form a barrier that retards evaporation. Constant humidity and mild weather are the key to rapid sprouting.

Unless the soil is fluffy, the new planting probably need not be rolled to restore capillarity. Rain or watering settles the soil adequately, after which occasional light sprinklings, perhaps daily in dry weather, should suffice to bring up the seedlings. With plenty of moisture and warm ground, such as is had in August or September, new grass should be visible within two or three weeks. Quickest are the perennial ryegrasses, with fescues, bluegrasses and bentgrasses somewhat slower.

Sod, biscuits of sod (plugs), or fragmented stems (sprigs) are much used to start lawns in the South. Soil preparation should be as thorough as for seeding. Plant at once so the live grass does not dry out. After firming into place, as by rolling a newly laid sod, or pressing plugs and sprigs with the foot, keep the planting moist. Within six weeks new sod should be well rooted.

Late Care

Mowing Before young grass reaches twice what will be its customary clipping height, mowing should begin. It ought to be frequent enough so that never more than 50 per cent of the green leaf is lost at any one clipping; grass that has grown



Photographs from The Lawn Institute

Plugs of two improved cultivars of bluegrass, 'Adelphi' and 'Bonnieblue', dug in early summer, are contrasted with common bluegrass. Note the greater leafiness, low to the ground, of the cultivars which have been bred for fine turf.

lanky has most of its green food-making tissues in the uppermost canopy, and suffers a breakdown of production if suddenly trimmed to stubble. In the North, colonial bentgrasses are typically mowed slightly less than an inch tall, and bluegrasses, fescue and perennial ryegrasses 1½ to 3 inches (the newer, low-growing cultivars withstand slightly lower mowing quite well). In the South bermudas are mowed much as are bents, with the other species handled much like bluegrass.

Reel mowers are generally most suitable for low-cut, meticulously tended lawns, while rotary mowers, which are more versatile and suck up floppy grass blades, are used for the general run of lawns and recreational turf. Low-cut bentgrasses and bermudas may have to be mowed twice weekly but intervals of five to ten days are usually enough for the other species.

Thatch Modern, luxuriant lawns produce an abundance of growth not always matched by decay of spent tissue. The re-



Section of inverted sod reveals thick root system that makes Kentucky bluegrass superior to other grasses.

sulting buildup of debris at the base of the sod is called thatch. Contrary to the general impression, lawn clippings add very little to the thatch; rather, succulent leaf tips cut off in mowing decay and disappear readily. Collecting clippings probably doesn't do much to alleviate thatch.

The most economical thatch control is earthworms. Where earthworms are eliminated, as when certain pesticides are used persistently, thatch usually worsens. A combination of many factors may prevent the ligneous leaf sheaths and lateral roots (prime components of thatch) from being recycled quickly.

If the situation turns so serious that fertilizer, seed, and even water, cannot easily penetrate to the rootzone, mechanical thatch removal is in order. For this the powered machines earlier referred to do an effective job with a minimum of bother, though thatch diminution will be only temporary unless causes for its formation are corrected. A lot of duff will be kicked loose from a de-thatching operation; it can be swept up for the compost heap or for flower-bed mulching.

Heavily used turf, and lawns on soil which compacts readily, might be further benefitted by aerification. This is accomplished with machines that poke holes deeply into the ground, removing a pencil-like core of soil. Spiking devices that merely press into the ground may actually compact the soil more, rather than aerify it.

Watering Watering is necessary if you are to have a lawn at all in the arid plains and the Southwest. In more humid parts of the country, watering is a luxury rather than a necessity but gives a spruced appearance to lawns when weather is dry. It is often overdone, causing shallow rooting, encouraging soil compaction and introducing water-loving weeds such as *Poa annua* and nutsedge.

The frequency of watering will vary with the soil; sandy types may need watering every few days, while heavier ones can store enough water to keep the grass green even for a few weeks. As a general rule irrigation should be undertaken

whenever the grass shows signs of wilting (turns bluish and is not crisp, footprints showing for some minutes). Watering generously but infrequently is usually appropriate. Sprinkle long and slowly for the water to soak a foot deep without run-off. This may take hours on heavier soils but be accomplished in minutes on sandy ones. The mechanics of watering are easy now because of inexpensive, easily installed underground systems that can be activated by timeclock to sprinkle for any set interval, any time of day or night.

Fertilizing Modern turf grasses should be fed at least moderately in order to take advantage of the fine qualities bred into them. Bluegrass lawns should receive at least 2 lbs. nitrogen (N) per 1,000 square feet annually, most of it in autumn. (Four lbs. is usually suggested, perhaps best applied twice in autumn, and once each in late spring and summer at slightly lesser rate.) Fertilizers formulated for lawns are rich in nitrogen, often with a ratio of about 5 parts N to 1 part phosphorus (P) to 2 or 3 parts potassium (K). An N-P-K analysis such as 27-5-12 is typical. The better lawn fertilizers contain some slowly available sources of nitrogen, such as might be derived from Nitroform. These are advantageous in that they don't give too sudden a stimulation of growth followed by quick exhaustion; rather the nitrogen is parcelled out over a period of weeks and even months for steady leaf production.

How much fertilization a lawn should receive depends upon the soil's native fertility, intensity of growth (increased by irrigation), whether the clippings are removed, and the kind of grass. Centipede grass in the South and fescues in the North are recognized as poor-soil grasses needing very little fertilization. Other species should receive at least the amount suggested for bluegrass, and even more is required for luxuriant bermudagrasses or golf-green creeping bentgrasses. Lawns of the Deep South may need more extensive feeding than those in the North simply because the growing season is so prolonged.

Pest Control Even the best managed lawns will occasionally experience weed invasion, insect attack or disease.

Weeds are probably the most ubiquitous nuisance. Most lawn soils have accumulated a reservoir of weed seeds, some of which sprout any time they are exposed. Other weeds, such as dandelion, drift in on the slightest breeze. Very seldom are weeds introduced with lawn seed, as carefully watched over as it is in these days of proprietary competitiveness and official scrutiny. The main thing to look out for is any appreciable "crop" content; "crop" refers to agricultural species that are not officially weeds, but which can become quite pestiferous in the lawn. Coarse, perennial field grasses are the main trouble makers. They are seldom amenable to selective chemical control.

Fortunately, a number of excellent weeding aids are now available. It is rather easily possible to control broad-leaf weeds (dicotyledons) with phenoxy herbicides such as 2,4-D (often combined with dicamba for broader coverage). Annual grasses fall before a broad assortment of pre-emergence crabgrass preventers and "mop-up" herbicides, such as the arsonates. Arsonates also take care of certain other nuisances, even nutsedge, and still other specifics, some of which are not yet labeled for home use, can be had for particular pests. Perennial grasses are really the only group for which there is no simple selective means of elimination. Rather all of the turf must be killed back with compounds such as dalapon, amitrol, paraquat or glyphosate, and the treated area then be reseeded. (Details on lawn weed control are given in the BBG Handbook No. 71 and 73.)

Insect control is in something of a state of confusion as this is written, with many insecticides being restricted for environmental reasons. About the best that can be recommended if your lawn is attacked by chinchbugs, sod webworms, billbugs and similar kinds that damage the above-ground parts, is to treat according to label recommendations with one of the available biodegradable insecticides (e.g., carbaryl, chlorpyrifos, dia-

zinon, malathion and trichlorfon).

Unfortunately, most of the long-lasting chlorinated hydrocarbon insecticides that persist in the soil—hence especially appropriate for grub control—are not now available. If Japanese beetle grubs become prevalent, milky spore disease (a biological control) works reasonably well. In some localities chlordane is still procurable, although frequently under restriction.

Disease control has similar limitations for the homeowner. Halting diseases effectively with fungicides is really a job for the professional. Good spray equipment is needed, to say nothing of exacting formulation and knowledgeable application. Even those specialized in disease work often have difficulty with identification, proper timing and so on. Luckily, changes in weather frequently put a stop to disease, which in any event may have run its course by the time it is very noticeable to the home gardener. Planting with disease-tolerant cultivars would seem the handiest means for disease prevention, applicable where new lawns are being started or old ones renovated.

Lawn tending, in keeping with everything else in our technological society, has grown more sophisticated and complicated with the passing years. So long as the suburban taste for "keeping up with the Joneses" exists, the trend towards better-managed lawns can be expected to continue.

An outgrowth of the trend towards higher standards requiring specialized measures has been the coming of age of lawn-service companies. Most of them take care of lawn fertilization and certain types of pest control, but leave the mowing, which is expensive, to the property owner. Professional management of recreational properties and condominiums has been increasing, too. Their extent and economic importance justifies hiring technical expertise. At the same time a wealth of easy-to-use products has been developed for the homeowner, so that it is readily within the capacity of the non-expert to have a spanking good lawn these days. ☘

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A HANDBOOK

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- A Living Ivy Wreath
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- An Ikebana Primer



DESIGNING WITH FLOWERS

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BROOKLYN BOTANIC GARDEN RECORD PLANTS & GARDENS

DESIGNING WITH FLOWERS

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Arrangement by Muriel Jaffe, photograph by George E. Ernst
A giant clam shell (*Tridacna gigas*) holds clipped palm, ti and pothos foliage with the flowers of Easter lily.

LETTER FROM THE BROOKLYN BOTANIC GARDEN

Flower arranging, like everything else in horticulture, has been evolving of late, and more and more people are experimenting with new ideas and unusual materials. Thirty years ago rather few Americans were familiar with the Japanese term Ikebana—much less Ikenohō. Today, if these aren't quite everyday household words, they at least spark a sign of recognition, and more of us would like to learn something about them.

The same is true of the various contemporary designs of more-or-less western origin. Sometimes we like such arrangements and sometimes we don't—without really thinking why. They are often intended simply to bring about an immediate aesthetic response on our part (the less fastidious among us call this a "gut reaction"). How much more pleasurable it is, though, to have a little background knowledge that can help us separate the good from the mediocre or just plain bad.

There are indeed still standards to judge modern arrangements by, thank goodness, although many of the restrictions of a former period have withered with time. This has given a spirit of liberation, even exhilaration, to many people of imaginative bent. The results of this creative fervor can be seen at flower shows all over the country, and the field is now open to all who were in the past intimidated by stern dos and don'ts.

How simple it is to be intimidated by an art form you have recently discovered! To help the beginning arranger or the person with just a simple interest in floral design, the Botanic Garden has turned to Guest Editor Muriel Jaffe, who has enrolled thirteen knowledgeable veterans of the art to give us an introduction. Thank you, Mrs. Jaffe and good contributors, for bringing us up-to-date.

One of the nicest things about flower arranging is that anyone can do it. The old-time cutting gardens have largely disappeared because of high maintenance (though it's usually no problem to include a row of gladiolus or Shasta daisies in the vegetable plot). Many people are finding a small mixed flower border the best solution for garden enjoyment and providing a few materials for arrangements. Whether you live in the city or country, there is also the florist to turn to as a year-round source of cut flowers. Often he will have treasures from other parts of the world that you simply can't grow at home.

City people, in particular, are apt to overlook common treasures. Goldenrods, asters and many other everyday plants are to be had in numbers and variety from vacant lots. Waste areas—heavens no! They are teeming with materials for the designer. Mrs. Jaffe matter-of-factly reports that she finds some of her finest trophies, wayside grasses, in neglected spots near the beach.

Interestingly, some of the foliage materials that are most highly esteemed in contemporary arrangements come from "cast-iron" house plants that most people grow at one time or another—ti, pothos, sansevieria and aspidistra. (See opposite page.) Do you think aspidistra is a lowly plant? Don't ever tell that to an experienced Japanese arranger.

Recently I asked Mrs. Jaffe what she had gained the most from her years as a floral designer. We were driving along a congested highway in a not very picturesque part of New York City. Pointing to a gnarled pine, she replied: "It's a way of looking at nature through different eyes. That tree may seem to you just a poorly grown specimen, but I think it has great form and wonder about it as a design itself."

Whatever your tastes, traditional or contemporary, read on and let this Handbook point the way to greater enjoyment in flower design.

Sincerely,

Frederick Mc Gourty, Jr.
Editor

*The creative flower arranger
begins with the study of nature*

DESIGNING WITH FLOWERS

Clementeen R. Wrenn

A FLOWER ARRANGEMENT is a composition, a sculptural work of art, created by the manipulation of selected plant materials and auxiliary components, such as containers and accessories, to fit a specific design.

To become skillful, the creative flower arranger begins with the understanding, appreciation and study of nature itself. The delicate, fragile colors and shapes of spring develop into the lush, full growth of summer, while the colorful yet also graying bounty of autumn changes to the clear, stark silhouettes and patterns of winter. In each season, each part of the country is filled with variety of shapes and forms, colors and textures. Branches sketched against the sky are light and feathery or bent and gnarled, and flowers range from the informal wildlings to the highly developed garden hybrids, from the small and full to the simple and bold.

Study the seasons and their gifts—your selectivity and inspiration will develop. These, combined with the knowledge of elements and principles of design, should help you compose accomplished arrangements.

Six elements and six principles of design are used to create our three-dimensional compositions. These are constants, and only the application varies. Imagination, individual expression, and distinction should always be an integral part, too.

1. *Space* is the frame of reference or area surrounding the composition. The scale of the parts and the completed whole are influenced by the size of this environment.

2. *Line*, as an element, lends direction and movement to the floral design. The line of direction may be vertical, horizontal, diagonal or circular, and the lines

may be continuous or interrupted, straight or curved.

3. The *Form* of an arrangement is composed of its shape and structure. This three-dimensional composition is based upon geometric forms, such as the sphere, cube, pyramid, or parts combined. In free form design the geometric form is not obvious, allowing more freedom of expression.

The medium already has form and each is combined into the composite. The variety of forms and the placement of these forms give depth and distinction to the design.

4. *Pattern* is the silhouette or distribution of the solids (plant materials) and voids (open spaces) to create an interesting composition.

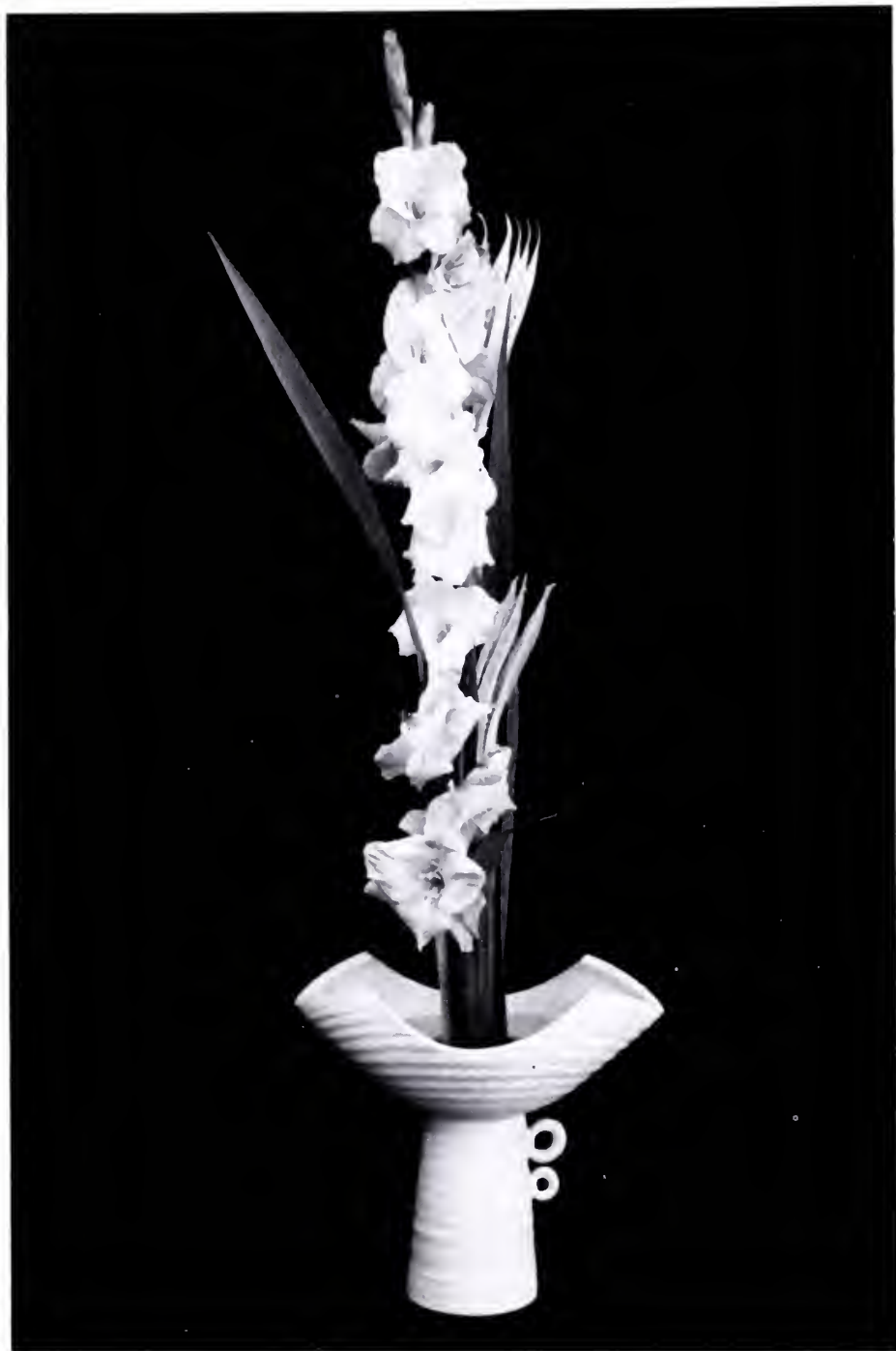
5. *Texture* is the surface quality and is best described by sight and touch. The tactile and visual qualities brought forth by the contrast of smooth and rough, glossy and dull, firm and soft, and coarse and fine provide character and variety when used creatively.

6. *Color* is perhaps the most sensuous of all the elements. It has a great effect on the entire design. Each color, including its tints and shades, provokes feelings that vary with the person. The arranger has available an infinite variety of colors in plant materials, ranging from subtle tones to bold and dramatic and combinations within.

Principles

The principles of design are the ways in which the elements are used to create a successful design.

1. *Balance* gives stability to the arrangement and may be achieved symmetrically or asymmetrically, that is, by actual or visual balance. There is an imaginary axis through the design, around



Arrangements by Clementeen R. Wrenn; photographs by George E. Ernst

This vertical arrangement features gladiolus, okra pods and the foliage of yucca.

A triangular-shaped container accentuates a triangular design. Three carnations in different shades of pink, plus yucca leaves, are used to form the triangle.



which the visual balance is accomplished.

2. The use of *Dominance* guards against monotony. The inequality of forces, whether they are of color, size or texture, lends more interest to the whole. A familiar example is the emphasis on one color in an arrangement.

3. *Rhythm* is the movement and direction in an arrangement. The skillful use of repetition and gradation insures visual action. A variety of sizes of a flower will lead the eye from one to another and throughout.

4. The *Contrast* of component parts adds variation and interest. The use of a heavy line with a thinner line, or a large flower with a smaller flower, emphasizes differences in a composition.

5. *Proportion* is concerned with the relative amounts, actual or visual, of one

area to another. Unequal proportions are more pleasing. A small number of flowers used with a greater amount of line material or green leaves is an example of uneven proportion.

6. *Scale* refers to the size of the individual parts. The overall size of the arrangement and space will dictate the size of the component parts. An oversized leaf or a large flower in a small design is out of scale.

Application

Inspiration for a flower arrangement may come from a theme, title, or idea, from a special container or sculpture, from the plant material itself, or it may be a combination of all three.

A "seeing eye" is developed, and all kinds of materials—not only flowers—

An oval arrangement of pussy willows and flowers of chrysanthemums with their own foliage.



may be gathered for a composition. Driftwood, sea shells and various memorabilia are some of the resources commonly used. Remember that plant material *is* our medium, but accessories can add interest.

The original pattern, whether it is a triangle, circle, crescent or vertical, must be kept in mind as you add material. Lines are placed to give height and form. Allow solids and voids to remain as the pattern is filled in. The placement of materials in profile, or one in front of another, will give depth and eliminate a flat, fan-like appearance. Light materials such as buds and delicate colors are placed in the perimeter, in traditional arranging, and then graded down to heavier, larger, darker forms toward the bottom or center. This tends to give

visual stability—as in a traditional masterpiece on a canvas.

In later and modern work, balance is attained in other ways. The beginner or inexperienced arranger does well to keep to a simple design with few kinds of plant materials in each arrangement. It is important to “tell one story at a time.” Too many lines, too many flowers, too many colors lead to a confused design.

Personal experience and studying the work of knowledgeable designers are the ways to attain excellence in flower arrangement. In time you will learn what plant materials look best in full face or in profile, upright or at angles, loosely or en masse. However, apply the elements and principles of design and they will help you create a successful floral structure. ❧

DESIGNS OF TODAY



Arrangements by Frances Louise Bode; photographs by William Bode

WITCHES' BREW The container is a black ceramic cauldron from Oaxaco, Mexico. Black bamboo sections (a natural color) form the vertical and diagonal lines and the vine actinidia creates the swirling pattern. The flowers are flame-colored gladiolus.

Contemporary flower arrangement is as varied as the people who practice it

Frances Louise Bode

A GOOD FLOWER arrangement, whether traditional or modern, should serve its function and purpose. This accounts for the co-existence of many artistic styles. The arranger designing for a special social event, the church or the home is sensitive to the character, degree of formality and spirit of the decor and occasion when selecting style and materials. In flower show competition the schedule will direct the designer, but she should be free to express and interpret in any style that will communicate her personal feelings about the theme or class. It is to the exhibitor's advantage to be conversant and skillful in all types of flower arrangement design when entering the flower show arena.

Flower arrangement today is a product of evolution. It recognizes the legacy of color and texture in European mass arranging, the awareness of line and space in Japanese floral art and the synthesis of both in the American line-mass designs. What we call *avant garde* has been strongly influenced by late nineteenth and twentieth century's art trends—impressionism, expressionism, abstraction, non-objective and new realism. It is not difference for its own sake but the creative search for beauty expressed in the idiom of today.

Undoubtedly the most distinguishing characteristic of today's flower arrangement is a new awareness of space, not only the three-dimensional physical space that the arrangement occupies but also the shapes of space created within the design. The design is not only *IN* space but also *PART* of space. Instead of the traditional focal point with materials radiating from it, the *avant garde* arranger equates interest throughout the entire design, including the container, by using rhythms of line, repetition of forms and colors, vivacity of silhouette and areas of defined space. These internal

shapes of space may be left free as rest areas or they can serve as frames for dramatic forms, textured with delicate materials, or provide a point of reference to draw the viewer's eye into the depth of the design.

Today's arranger seldom relies on the more obvious use of figurines to tell her story. Design, whether interpretive, expressive or non-objective, evolves by utilizing the distinctive characteristics of each material. The creative designer knows and takes advantage of the universal qualities inherent in the elements, line, form, texture and color, for this is how she communicates with the spectator.

Lines may project ideas with dramatic diagonals, flowing curves, erratic zig-zags, ascending verticals, tranquil horizontals and rhythmic spirals. Combining these with textural sensations—sleek, smooth, rough, coarse, spiky, velvety, etc.—reinforces the impact of both line and form. A shiny red apple has a very different design effect than a pebbly cluster of red berries or a satiny magnolia leaf as opposed to a craggy loquat leaf.

Although everyone has an innate response to color—like, dislike or indifference—these may be partially determined by individual experience and ethnic heritage. While the symbol of mourning in the Western world is black, it is white in the East. Yellow represents royalty in much of Asia; purple is its counterpart in Europe. However, certain qualities of color, irrespective of special symbolism, generate the same response the world around, warm and cool, light and dark or bright and dull. Cool blues and greens suggest the depth, peace, distance and serenity of water, sky or forest. Reds and oranges connote fire, danger, warmth, sunshine or joy. Intense hues are exciting but as they are lightened or dulled the reaction becomes more placid and reserved. In *avant garde* flower arrange-



CONFRONTATION This arrangement is displayed in a handmade, deeply incised ceramic container, medium-tan in color. The line material is physianthus vine (*Araujia sericofera*) and the flowers are fresh Australian banksia, gray-beige, with delicate orange stamens.

ment, there is often a minimal amount of materials and the artist must be sensitive in selecting and combining colors to convey to the viewer or judge her interpretation.

One of the most distinctive features of today's arranging is an entirely new approach to the selection and handling of materials. The creative arranger searches constantly for new materials, fresh or dried, weathered wood and roots, new or found man-made objects, from which to derive inspiration. Often, re-assessment of things already gathered will expose new ways in which they can be used.

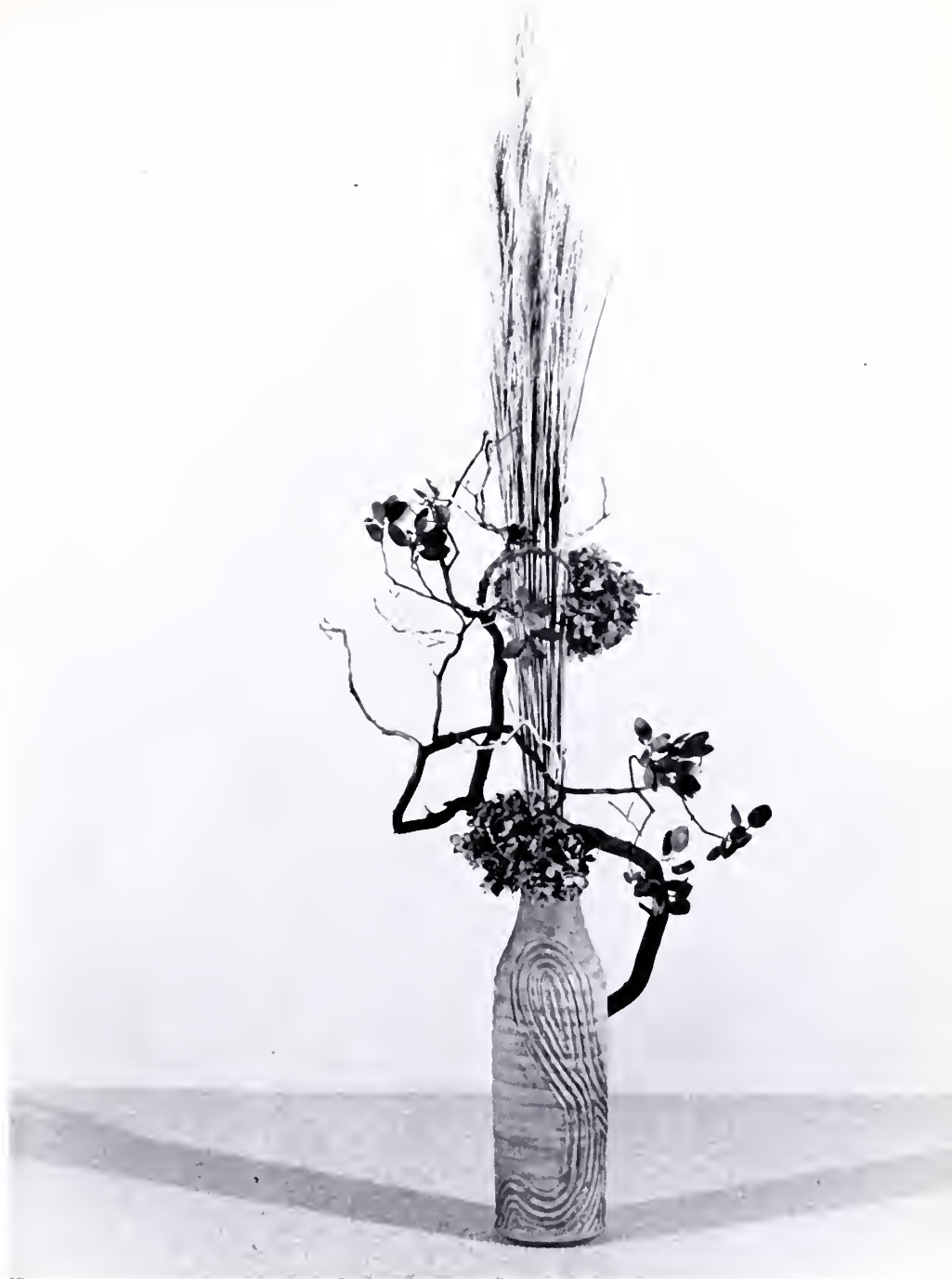
In contemporary arrangement the designer disassociates each material from its season and source and studies it as line, form, color, texture and the contribution it can make to the design. Old taboos as to what is proper to combine have long since been discarded. What an object was or what purpose it once served gives way to the study of it as a design element. Several links of heavy chain encrusted with beautiful orange rust found

at the seashore, a piece of weathered worm-eaten wood and copper chrysanthemums make a dramatic organization of forms, colors and textures.

Even in conventional arrangement the designer altered materials to achieve the intended effect, eliminating excess leaves, removing twigs and branchlets or separating clusters of flowers. Today, however, the arranger goes a step further, trimming leaves into controlled, pre-determined shapes, folding them to create new forms or bending stems into geometric designs. Materials that do not require water, dried or glycerin-treated, and weathered wood or roots, open new avenues for experimentation. They can be used outside the container, suspended in mobiles or mobile units within a design, at an angle to create a strong diagonal thrust or upside down if it dramatizes a line or form. Several pieces of wood can be combined to make exciting, free-standing structures to be used with fresh plant materials or as sculpture. Lovely wall pieces, using not only wood but also shells, pods, cones and other natural materials, are limited only by the imagination of the designer and the setting they are to enhance.

One of the most abused methods of changing materials is painting, but it can be justified if it is done with restraint. Often, in interpretive flower arrangement, thoughtfully used painted branches or wood (never fresh plant material, please!) can reinforce the theme or create special effects. When combining several branches or pieces of wood of varied colors, antiquing stain—applied and quickly wiped off—can make them more compatible. The possibilities in handling and altering materials are endless and justified only if done with serious design intent and not merely to be different or startling.

The ultimate aim of art is communication. It should beautify, be compelling and responsive to the needs of both the artist and the spectator. Today's flower arrangement is not an isolated phenomenon but retains the best of the past, mirrors today and incorporates the promise of the future. ❀



INVOLVEMENT The container is a handmade stoneware bottle. Plant material is plume grass, High Sierra manzanita and hydrangea flowers—all treated with glycerine. Colors range from honey-beige to very dark mahogany-brown. The plume grass has been bound and taped into a sheath, the manzanita is fastened across the lip of the bottle, and the hydrangea stems are inserted in the bottle.

Functional and beautiful as well

MAKING YOUR OWN CONTAINERS

Rae L. Goldson

ONE of the reasons why flower arranging fascinates many people is that it offers an opportunity to be truly original. Making your own containers* from scraps of wood, cans, pans or other materials is a craft in itself. These handcrafted containers enhance flowers and can be beautiful in their own right.

A container, above all, should be functional. It should be large enough to hold the pinholder and water to keep the plant material fresh. It need not be elaborate, nor of a color that demands the viewer's attention. Its size, shape and color should be selected with the thought in mind of the finished arrangement. The larger your collection of containers the better the chance of finding the one you want.

The right mechanics for each container are the first step toward a well-constructed arrangement. A knowledge of them will not only aid you in achieving compositions that are firmly set in position, but also provide ideas for arrangements that you might never have dreamed possible.

Mechanics

1. In a flat container or dish, one whose height is less than 3 inches, use floral clay to anchor the pinholder. Place a small ball of clay on the center of the bottom of the pinholder and press down securely. Be sure that the container and pinholder are dry, otherwise the pinholder will not be securely fastened.

2. In a tall container, anchoring the pinholder with melted paraffin is better than using floral clay. Melt some paraffin or ends of old candles in a pot or can and, having selected the right pinholder for the container, pour one-eighth of an inch in the bottom. Then place a stem or branch in the pinholder and lower it into the melted wax. Let paraffin set and remove stem.

3. If you have a very tall container try building it up with crushed wet newspaper (one sheet at a time) from which most of the water has been removed. Pound it level with a small wooden masher to about two-thirds the height of the container. Then place several thicknesses of dry newspaper, cut to the shape of the bowl, on top of the crushed paper and pour in one-eighth of an inch of hot paraffin. Lower the pinholder into position and let set. This elevates the pinholder in the container so it will be easier for you to control placement of the plant material. Also, you will not require long-stemmed material to give necessary height above the rim of the container.

4. When planning to make a mass arrangement in a tall container or a compote, place a pinholder in the bottom and add a cap of chicken wire near the top. You will then be able to place the plant material in the container at proper angles to best carry out the intended design.

5. When planning to use thin-stemmed plant material for a mass arrangement, you may use Oasis (be sure it has been soaked in water for several hours), but add a cage of chicken wire to the top and secure with florist linen tape.

6. If you are using a bottle or candle holder, place an adapter, available from florist supply houses, in the opening, making sure it fits securely. Add a cage of chicken wire to the top to keep the Oasis from crumbling.

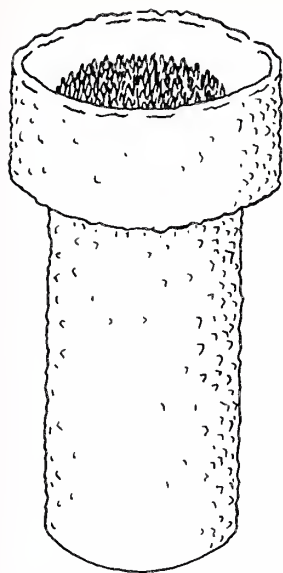
Containers

Tree Container. From a tree trunk, saw a log about 10 inches long. With a chisel or drill make a hole on top to hold a can or cupholder.

Wooden Baluster. Set a can on top for water and pinholder. Secure with glue. Paint or stain as desired.

Metal Cylindrical Vase. Use an empty

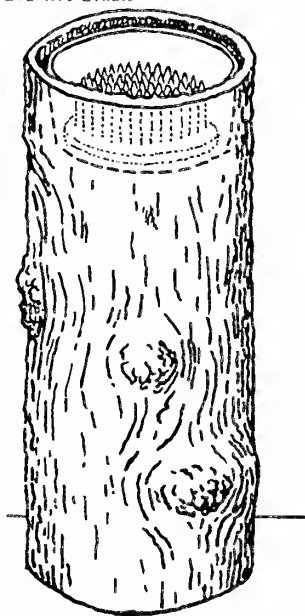
*For a fuller discussion of this subject see the author's *Workbook of Containers, Stands and Mechanics* (Hearthsides Press, Great Neck, New York; out of print).



Above: A modern container (see page 14) results when two cans of different sizes are combined. The design (right) of cattails, skeletonized cactus leaves and cockscomb flowers is in such a container.

Below: Container made from a tree trunk.

Drawings by Eva Melady from author's sketches; photographs by Bramore Studio





tuna-fish can for the top and a metal cover that matches size of can (inverted) for the bottom. Cut a piece of aluminum mesh sheeting 10½ inches high and wide enough to fit circumference of the can. Fasten with thin wire at one-inch intervals. Twist tightly to hold. Paint black or any desired color.

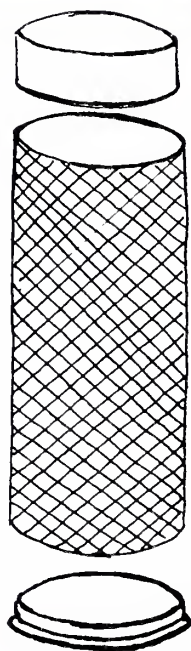
Baking Pans. Cover sides with a paste made of spackle and water. Pull prongs of a fork up and down to give textured surface. Allow to dry thoroughly. Paint outside of container any earthy color and inside either chartreuse or aqua. Make six legs of one-inch pieces of dowel, small spools or ball-shaped buttons and glue to bottom of pan. Another container may also be made from a baking pan. Cut half-round molding the same size as the side of the pan. Glue molding to the bottom sides of the pan. Cover the outside of the container with a thick coat of white shellac and dip sides of pan in vermiculite or grit until entirely covered. Allow to dry. Paint outside and inside in same or contrasting colors.

Bamboo Containers. Wrap a bamboo place mat, cut to size, around a tall fruit juice can. Staple or sew in place. Painted, corrugated paper may be substituted for bamboo.

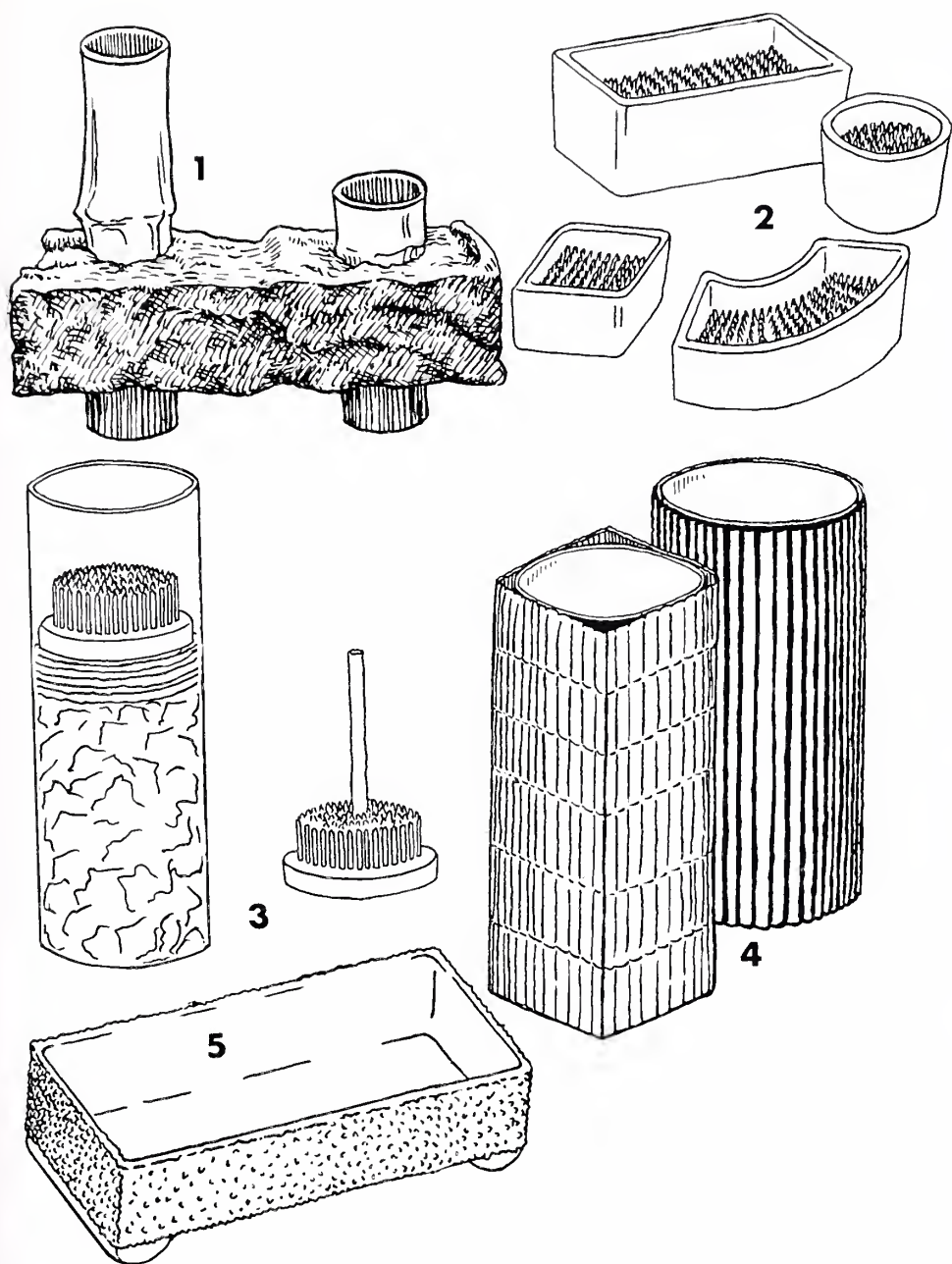
Modern Containers. Use a beer can for the base and place a shorter, wider can or metal bowl on top. (Add grit to beer can for weight if necessary.) For another version use a large fruit juice can with a coffee can on top. Fasten with glue. Anchor a pinholder in the top container with melted paraffin. Cover the outside with a coat of shellac, and cover with grit or vermiculite while still wet for textured surface.

Lamp Bases. Many old lamp bases make excellent containers for mass arrangements. They may be painted or sprayed gold or silver as desired.

Glass Containers. A colorful container
(Continued on page 16)



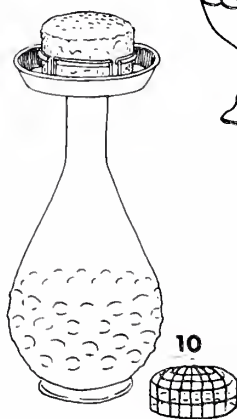
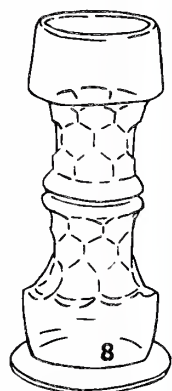
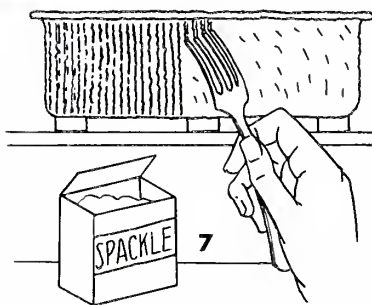
◀ A metal cylindrical vase has been formed from radiator screening but any aluminum mesh sheeting could be used. A tuna-fish can or similar container can be placed in top of cylinder to hold flowers, as above.



An array of contrived containers and mechanics: 1 styrofoam container; 2 cup pinholders, in various sizes and shapes, are useful in baskets and other containers that don't hold water; 3 technique for handling a very tall container (see page 12); 4 covered containers; 5 container made from a baking pan (see page 14).



Easy-to-make containers and mechanics: 6 arrangement in a gourd (above); 7 another baking pan container (see page 14); 8 glass containers; 9 technique for handling a compote for a mass arrangement; 10 technique for bottle or candle holder; 11 wooden baluster converted to a container.



may be made from two Georgian glasses. Invert one and glue the other on top of it. Place on base for stability.

Coconut Spathes. A boat-shaped container can be cut and then bent to shape by soaking in warm water for a few minutes. Raise on a wooden inverted bowl attached to spathe. Fasten a eupholder on top with clay to hold plant material.

Fruit and Vegetables as Containers. An eggplant, pineapple, pumpkin or gourd may be used. Cut off top and scoop out a hole large enough to hold a can for pinholder and water. If container is hollow inside, fill it with crushed newspaper before placing eupholder in position. A fruit or vegetable container is for home enjoyment, not for flower show competition.

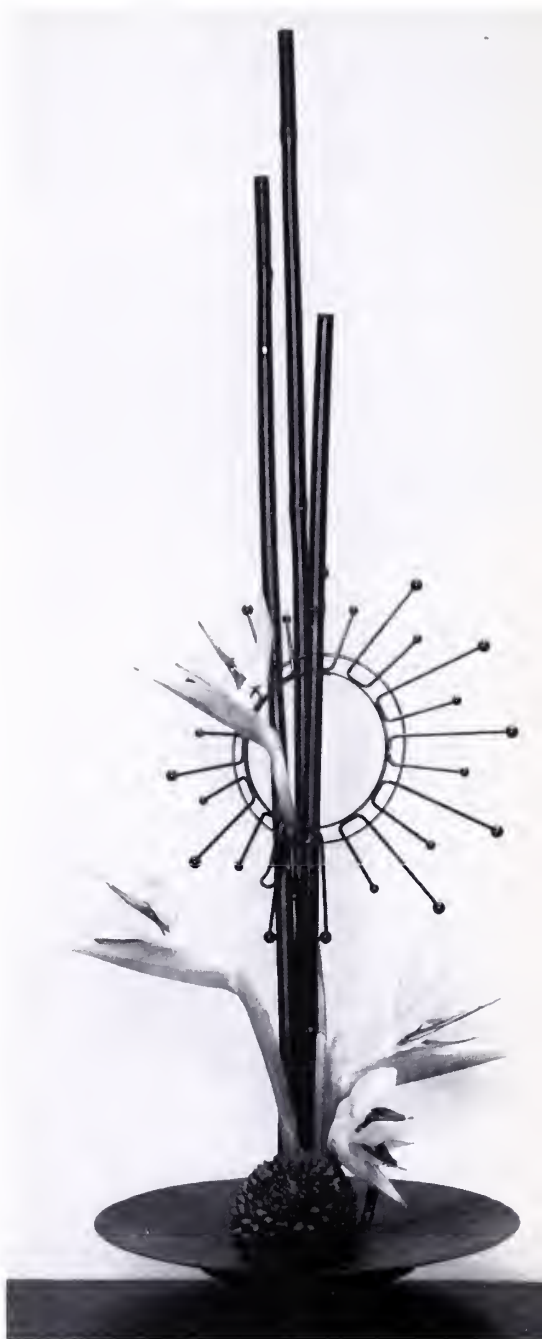
Pedestals. To make a pedestal for a compote stove-top container, find a can to fit base and paint to match container. For an interesting effect cover can with corrugated paper or marbled contact.

Barrel Cover. A tray may be made from a steel barrel cover. Paint outside black and chartreuse green inside.

Plow Disc. If a used farm-implement shop is nearby, get an old plow disc. It can be placed on a pedestal or an upside-down flower pot for a lovely low container.

Styrofoam Container. Take a rectangular piece of styrofoam. Cut two holes to fit pieces of bamboo cut at different heights, allowing 2 inches below for legs. Slip bamboo through holes, one to hold plant material and the other on which to set a figurine or leave empty as desired. The paint when sprayed will cut into the styrofoam to create an irregular surface. Fill any large holes with clay. When completed it looks like a piece of rock or cement. While paint is wet, cover with grit or vermiculite for rough textured effect.

Brick Container. Find a brick that has two or three holes. Slip pieces of bamboo through holes one higher than other. Leave two inches for legs and upper part extending above brick for mechanics and plant material. ❀



*Arrangements by Rae L. Goldson,
photograph by William Sevecke*

An old plow disc can be converted into a lovely low container. The flowers in this arrangement are bird-of-paradise.

*Consider flowers and foliage for
arrangements when planning*

THE FLOWER GARDEN

Edmond O. Moulin

FLOWER BORDERS, which were on the decline in popularity for a few years, are making a comeback as gardeners realize that all-lawn and all-green gardens are not the low-maintenance, inexpensive paradises they were claimed to be. Part of this resurgence is undoubtedly due to our basic, unabashed love of color, particularly if the surrounding countryside or cityscape leaves much to be desired in floral interest.

Good flower borders don't have to be extensive nor need they contain large numbers of plants that require frequent attention. Properly begun and subsequently tended with regular but not necessarily time-consuming effort, such borders can be a joy, especially if you plan to include a few annuals and perennials specifically for cut flowers.

Soil and site considerations are discussed at some length in my article in the Brooklyn Botanic Garden *Handbook on Annuals*, but I would stress again that careful preparation of the border, including the thorough and deep incorporation of compost or peat moss, is very desirable for both annuals and perennials. So is a mulch, which will retain soil moisture and cut down on weeds. To make weeding and the removal of spent flower heads easier, the border should not be so wide that you must skip and hop about in it, the soles of your shoes compacting the soil and the heels inadvertently tromping on the crowns of plants during Saturday morning garden-keeping efforts. Please, please, a narrow border you can weed on hand and knee from the sides, or if it must be large, a few stepping stones ("puddle jumpers") in between.

The majority of annuals and perennials require sun for a good portion of the day if they are to be thrifty, floriferous and

compact, and have few pest problems. Provide good drainage, too. As a rule, groups of three or more plants of a kind are desirable for garden effect—and to give at least some material for cutting without detracting from the display. In the case of most annuals (and a few perennials), the more flowers that are cut for indoors, the more there will be on the plants later in the season, because new growth starts from the laterals beneath where the cut is made. Call it a form of pinching if you will—it has the same result. Also, plants will require less deadheading. This is a special blessing with petunia, calendula, cosmos, marigold, snapdragon and zinnia, all of which are first-rate plants for our purposes.

Favored Perennials

It is no surprise that most of the annuals and perennials that are suitable for dried flower designs are excellent for fresh flower arrangements. For more information on delphinium, baby's-breath (*Gypsophila*), globe-thistle (*Echinops*), sea-holly (*Eryngium*), yarrow (*Achillea*) and a host of others, see BBG Handbook No. 76. One very nice aspect of using these materials in fresh arrangements is that no great harm is done to them if you forget to replenish the water in the container.

Oriental poppies, iris and peonies are common perennials used for cut flowers. It should be quickly pointed out that none are trouble-free, but if just a clump or two of each is needed for your purposes, garden maintenance does not increase greatly. Few plants make more of a display than Oriental poppies in their brief flowering period in late spring. Besides orange (the traditional color), there are varieties with white, pink and red

Baby's-breath
(*Gypsophila paniculata*)
is a basic garden perennial. Its flowers, used both dried and fresh, seem especially appropriate in the more traditional mass arrangements.



Marjorie J. Dietz

blossoms. They do not make exemplary cut flowers, but arrangers will continue to use them. In the garden, poppy foliage dies down by midsummer, so set out late annuals in front to hide it or, better, plant hostas, late-starting perennials, the leaves of which attain full size when poppy foliage is withering. Many kinds of hosta, especially the variegated *H. undulata*, provide fine cut foliage for arrangements.

Siberian iris (*I. sibirica*) is one of the longest-lived species of a noble genus—and most dependable in the garden. The relatively small purple to white flowers are more in scale with modern arrangements than are the ones of the common bearded iris, which is subject to borer damage and soft rot. Japanese iris (*I. kaempferi*) has attractive large flowers, but culture is difficult in the average garden for this moisture-loving species. Dutch iris is best purchased as a cut flower from the florist.

Peonies are popular old-time dooryard plants and seem to perform better in the shrub planting or in turf than in a flower garden, where the rich soil and frequent watering induce lush growth that is prone to botrytis. With benign neglect, and left to themselves in an open spot with good air circulation, peonies can last a lifetime. There are many

named varieties with single or double flowers (shades of white, pink and red, plus a yellow).

Bulbs, notably daffodils, tulips and gladiolus, are mentioned several times in this Handbook. A full discussion of their requirements is found in the *BBG Handbook on Bulbs*. They are generally of easy culture, and a few should be grown in every arranger's garden. Of particular interest for modern arrangements are the miniature gladiolus.

Herbs

In my own home I am fond of using garden herbs in table arrangements, where the fresh greens or bright grays seem very appropriate. The faint aroma of mint, lemon balm, lemon-verbena and pineapple sage encourages the appetite, above all if a not-to-be-noticed hand with a boardinghouse reach happens to brush lightly against the arrangement. The principal mints, spear-, pepper- and apple-, are of distressingly simple growth and do not often know their proper place in the flower border. It helps to plant them in a large, wide plastic container (bottom perforated), which is then sunk in the soil *almost* to the rim.

Lemon-verbena (*Aloysia triphylla*; formerly *Lippia citriodora*) and pineapple sage (*Salvia rutilans*) are not frost hardy,



The flowers of Shasta daisy (*Chrysanthemum superbum*) are long lasting in the garden or in arrangements. The flat-topped yellow heads of yarrow (*Achillea filipendulina*), also long lasting, are popular in dried arrangements.

so bring them indoors before cold weather comes and cut them back sharply in January for propagating material for new plants in the succeeding year. Sometimes it's better to buy new plants in the spring.

Do you want a change from baby's-breath? Try dill and you will be pleasantly surprised by its light green airiness and tiny yellow flowers. This annual (or biennial) has become naturalized in many parts of the United States, but home gardeners who would like a continuing supply may sow seeds every couple of weeks in warm weather. The variety 'Bouquet' is somewhat more compact than the typical kind and is preferable in the garden.

Basil 'Dark Opal', an annual with deep maroon foliage, is topnoteh in some arrangements but it should be used with care on the table since the leaves are

almost too aromatic. Lavender, a perennial subshrub with gray leaves and spiky flowers, gives a spark to indoor designs, too. Its aroma needs no description. Betony (*Stachys officinalis* and *S. macrantha*) and a perennial violet-flowered sage, *Salvia x superba*, also provide good floral spikes from the herb garden. The latter might be substituted for *Salvia farinacea*, which has a foul odor. Catmint (*Nepeta faassenii*; formerly *N. nussinii* of gardens) should also be considered for its blue-violet flowers and fragrant foliage. It is in bloom a good part of the summer if cut back after the first wave. The taller perennial veronicas, with flower spikes of white, pink, blue or purple, are other choices.

Late summer is flowering time for the more-or-less airy eupatoriums, many of which have had herbal uses over the years. They are almost too vigorous growers for the garden—and a number can be found along the roadside anyway. Included are Joe-pyeweed, boneset, white snakeroot and mist flower ("hardy-ageratum").

Another plant that bears watching in the garden is the fern-leaf tansy (*Tanacetum vulgare* 'Crispum'), but it makes a superb fresh green foliage foil in arrangements. To keep it from overrunning less rambunctious neighbors, give it the same container treatment described for mint. Various artemisias, including one of several plants that is called dusty miller, *Artemisia stelleriana*, and the ghost-plant (*A. albulu*), are good for silvery foliage. They perform best in a sunny spot in rather dry soil that is not overly rich.

A word perhaps about the carnation (*Dianthus caryophyllus*). In view of its wide (if waning) availability from florists, you may not wish to include it in the garden. The carnation is often described as a perennial, but in many parts of the country it is best treated as a biennial and mulched heavily over winter. For a change, try sweet William, another dianthus of easy biennial (sometimes annual) culture. The beautiful salmon pink variety 'Newport Pink' tends to be a short-lived perennial. ❀

TRADITIONAL FLOWER ARRANGEMENT

Amalie Adler Ascher

TRADITIONAL design is an all-time favorite among styles of arrangement. Recalling scenes of a garden, it features natural grace, displaying plant materials as they grow. Color is especially appealing since it complies with familiar schemes. And composition develops in logical order as sizes and shapes undergo gradual change.

Types

The traditional arrangement falls into three basic categories known as Line, Mass and Massed-line. Each reflects its own historical origin. The earliest and most fundamental form is Line, a simple design of open silhouette. It relies on just a few materials to convey an outdoor picture of quiet and well-being. Although not necessarily constructed according to strict Japanese rules, a Line arrangement follows a similar course. Most often it consists mainly of a shapely branch that is both central to the design and creates its principal course. Shorter, less important branches (usually not more than two or three) act as secondary lines to lengthen or change the original direction. Finally, without spaciousness being disturbed, flowers are added. Few in number and placed in low positions, they provide a vital color accent as well as a terminal where lines and movement converge.

Mass, the second category, seems more complex and elaborate as well as more formal. Full-bodied and rounder in shape, it contains quantities of plant materials chosen primarily for their similarity but with some variation to increase interest. Mass design is typically European. It bears to still-life painting the same relationship as Line does to Japanese composition. Though influenced by Period styles, Mass arrangement does not particularly try to emulate any one, preferring instead a general interpretation. However, the relationship between plant

materials is similar. Alone, each is a separate attraction; together, they become even more appealing, their colors and textures enhanced through interaction.

Massed-line, as the name implies, constitutes a merging of Mass and Line. It is a Western innovation incorporating both forms for a still different effect. Fuller than simple Line but more restrained than Mass, Massed-line at the same time conforms to a strong linear pattern but strengthens it with a greater concentration of materials. Design may take several forms including the less rhythmic vertical, horizontal, or diagonal, or the more undulating Hogarth or S-curve. Again, compatibility is the keynote.

If you analyze a traditional arrangement regardless of style, you will find it usually consists of three different types of plant materials, the quantity depending on the simplicity or fullness of a design. Whether flowers or foliage, all are classified generally as elongated, round or filler forms though there may be some overlapping. Each group performs a specific function.

Like a building whose foundation is laid by a few exterior posts, a floral composition needs basic linear materials to establish its center, direction and frame. Responsible for structure, they are best described as elongated in appearance and coincide with the categories from which they are drawn. Including materials from trees and shrubs, as well as flowers and individual leaves, this group offers almost unlimited choices. Among them: bare, flowering or leafy branches; spiky stalks such as of gladiolus, snapdragon and delphinium; bold, pointed leaves as ti, iris and bird-of-paradise; vines; roadside wildings, mullein and cattail; and such vegetables as okra and carrots.

Construction of an arrangement begins



From The Complete Flower Arranger by Amalie Ascher; photograph by Duane Suter

The arrival of spring is signified by this open, airy mass in a triangular design atop a container depicting "the three graces."

with a main line, a sturdy, well-shaped branch or flower that forms the vertical axis. The length of this stem establishes overall height. The tip when aligned with the center of a design sets its balance. (If it leans backward or forward, or off to one side, this crucial placement can cause the finished arrangement to look unsteady.) Next, two or more shorter secondary lines are added horizontally to mark width. These primary lines, like dots in a numbered drawing, indicate outer shape. The pattern might resemble a fan, oval, rectangle, or simpler figures mentioned earlier. But whatever the design, elongated materials are placed first to establish a framework.

Essential to all arrangements is cen-

tral focus, an area or areas of concentration where lines converge and movement stops. Round forms serve this purpose best and, when grouped in two's or three's and spaced in irregular intervals, give composition a graceful flow. As another means of rhythm, sizes of flowers and leaves are graduated, smaller ones in upper and outer areas becoming larger as they reach the center and base. Sequence in size serves further as a visual path leading the eye in and around a composition. Examples of round forms are easy to recognize—the common rose, carnation and zinnia coming to mind first. But this class is also open to other shapes, for example lilies, crested celosia, and architectural rosettes of leaves that include



Arrangement by Amalie Ascher; photograph by William L. Klender

The graceful curved branches of the sourwood tree (*Oxydendrum arboreum*) with its delicate flower sprays, form a massed-line background for the single flowers of the dahlia 'Gem'.

rhododendron and English ivy.

With outline and centers of attraction established, an arrangement needs one remaining type of material to close the gaps left by the sharp differences in the shape of the first two. Filler becomes the unifying factor. It provides missing transition as well as fullness to a design. However, quantity is restricted to essentials; too much chokes an arrangement, but used sparingly, filler breaks up pronounced spaces without crowding them. Picture this material as spray-like, bushy or feathery, leaves small and clustered in numbers on a stem, or florets comprised of multiple heads. Possibilities here range from boxweed to fern, from dusty miller to statice, and from heather to freesia. Remember too, that size is relative. What may be appropriate as focal area in a small design (miniature carnations, for example) could be equally suitable as filler in a larger one.

The use of color mentioned earlier deserves fuller attention because it contributes appreciably to the character of traditional design. Since theory is explained in another part of this Handbook, coordination will be emphasized here. With harmony and unity as main objectives, color becomes a principal force in accomplishing both.

Although a traditional arrangement may be composed of either rich colors or pastels in related or complimentary schemes, in no case should the range be so great or the mixture so varied that such principles as repetition and similarity are non-existent. Though limited in shades to those closely associated—*e.g.* dark red, blue, purple and burgundy, a design can still look disorganized if the mixture is composed of only a single flower of each. Without the dominance of one color due to its greater quantity, a composition loses continuity but benefits when at least two examples of the same color are included. On the other hand, what could be more monotonous than an arrangement devoid of any gradation? Some change in color is necessary to separate shapes and define pattern.

Besides its effect on composition, color

also influences an arrangement's character and powers of attraction. Since traditional designs try to attain a feeling of tranquility, they are likely to consist of some form of related harmony. As one example, a combination might be composed of light and dark variations of one hue, as violet in tints, tones and shades ranging from lavender to deep purple. Or as an alternate, a sequence of different but allied hues called analogous, namely yellow, orange and salmon, could be combined.

In a different type of traditional design, the opposite effect may be sought, especially if plant materials are a means of representing a particular occasion. Complementary colors serve such a purpose best, stimulating, as they do, the senses through contrast. Few associations are more traditional than Christmas or Easter, both festive in character and each unmistakably connected with strong intensity of opposing schemes. Perhaps this same reason accounts for the pairing of purple and gold to designate royalty, both suggesting prominence and respect.

Another facet of color involves coordination, the effect of two or more hues on each other. In some instances, shades, so close they would appear to match, can surprisingly clash once variations are seen side-by-side. Though a pink scheme including carnations might be planned, different varieties of the same hue can deviate considerably. In asking for a bunch of this flower, you are likely to encounter one group with a yellowish cast, another leaning toward blue. Although extremes in color are a means of distinguishing modern design, sharp differences become a disruptive element in a traditional one. Therefore, the planning of an arrangement must include a comparison of flowers and foliage to determine their compatibility.

Traditional designs may be formal or informal, but rarely a mixture of both. The effect depends on the style of container, the material of which it is made, the shape of the arrangement and the flowers and foliage individually and collectively that compose it.

Line arrangements are more apt to be of a casual nature as their patterns are usually drawn from the landscape. Boughs of pine or winter's bare branches, chrysanthemums and gerbera flowers in low rustic ceramic bowls typify the intended concept of unpretentiousness. Massed-line conveys greater refinement through its stricter conformance to a definite outline. Elegant flowers such as lilies, roses, snapdragons and anemones, as well as the graceful shiny curves of camellia foliage and cascading leucothoe, seem to suit its character most appropriately.

Mass can follow either course depending on how loosely plant materials are organized, their number and from which category they have been selected. Though overlapping occurs, some flowers and foliage, such as daffodils, iris and aucuba, can adapt to any style. Yet, an airy oval composition of garden blossoms spilling from an earthenware jug clearly reflects its origins, which are not to be confused with the formality of a lavish display of florist-grown gladiolus, stock, carnations and tulips symmetrically posed in a silver urn. ❧

From The Complete Flower Arranger by Amalie Ascher; photograph by Duane Suter

When properly pruned, a single branch of magnolia by itself becomes a line arrangement. It is accented by two whorls of rhododendron foliage. The magnolia blossoms are not long lasting, but effective in such an arrangement.



Beautify your table with

ARRANGEMENTS TO DINE BY

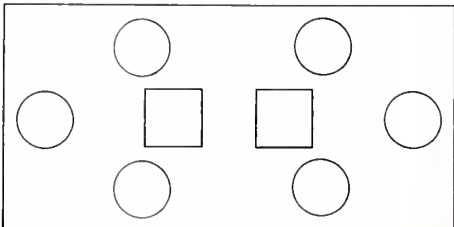
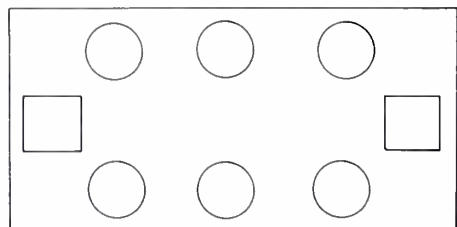
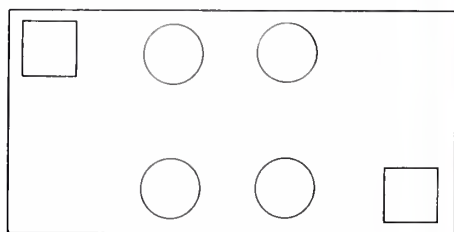
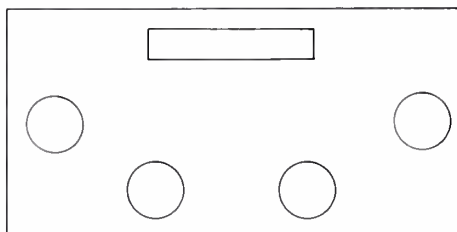
Muriel Jaffe

THE FLOWER ARRANGEMENT you create can add zest to your table setting and contribute to the enjoyment of dinner guests and yourself. An arrangement can be a most compelling display because it coordinates all the component parts of the table. A well-designed table should be unified so the total picture is in harmony. This is true even when a contrasting color scheme is used. All elements—table covering, appointments and arrangement—should work together and be placed in a rhythmic pattern to enable the viewer to see the complete table setting at a glance. Of course, in order to obtain this result any eye-stoppers must be avoided. If your guests or flower show judges notice one part before another, there is an error in the total presentation. Strive for unity!

Contrary to popular impression, the flower arrangement or decorative unit, as it is often called, need not be in the center of the table, so the term centerpiece does not necessarily apply. The decorative unit is best kept to no more

than one-third the table length and should allow guests visibility across the table. An easy test for the correct height of the arrangement is to place your elbow on the table with the forearm and hand erect. The arrangement should not be taller than the outstretched fingertips, except perhaps for a fine line or two of plant material that may be necessary to the design. There are no height restrictions for an arrangement on a buffet table, but balance is a concern. If the decorative unit is placed on one side of the table, it must be balanced with an object or objects of somewhat equal visual weight on the other side.

At a seated meal the arrangement may consist of one or two parts, possibly more depending on the length of the table; the parts may be together or separated. No matter where the arrangement is placed, it must be finished on all sides. Some suggestions for placements of decorative units for a seated meal are diagrammed below. The choice will, no doubt, be determined by the number of



place settings required. About 24 inches should be allowed per person at a table.

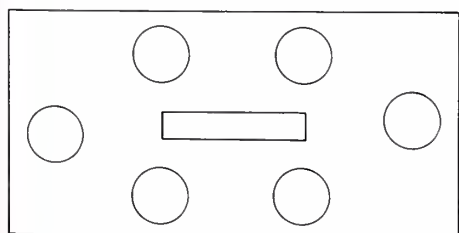
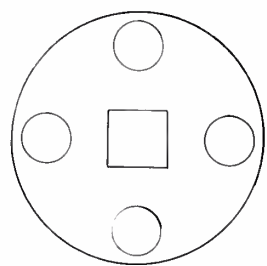
The last drawing shows the most common type of placement, but distinction can nevertheless be achieved in the decorative unit.

The choice of container, plant materials and how they are used make for distinction. If you have always designed mass arrangements for table settings, how about a change? It will be a challenging new experience and will require less plant material. A few flowers and some foliage well placed, with a graceful vine running through the design, create motion and have an alluring quality. A design that is simple and makes use of space tends to make the table look less cluttered. I often incorporate candles in the arrangement because this reduces the number of appointments and also helps eliminate clutter. If, however, you choose to have candles flank the arrangement, they should be either taller or shorter than the decorative unit. The height differences add to the interest of the total table setting.

To include candles in the design, use $\frac{1}{4}$ -inch hardware cloth to hold them. From the cloth cut a rectangle $1\frac{1}{2} \times 2\frac{1}{2}$ inches, depending on the size of the candle and be sure to keep one of the $2\frac{1}{2}$ -inch sides spiked. Fit the mesh

rectangle around the candle base, then remove the candle and proceed to lace the mesh closed with any suitable wire. Wrap tape around the wire holder in an appropriate color, either green or brown to blend with the plant material, or a color to match the container or candle. It is essential to leave $\frac{1}{2}$ inch of the spiked end untaped so the holder can be impaled in the pinholder. When the candle is inserted in the holder, keep it elevated $\frac{1}{2}$ inch from the bottom because this space is required for the mechanic to be properly secured in the pinholder. These holders can also be made for tapers, but allow for a smaller circumference. The number of candles to be included will depend on the design and the size of the pinholder. (Also see Bob Thomas' remarks on page 50 concerning mechanics for decorative wood arrangements.)

A design I particularly enjoy making is a horizontal "S" or a modified version of it if the plant material is less flexible. On a burl board, marble slab or disc (a cheese board will do), or in a low container, use an appropriate pinholder. (Choose a cup pinholder when the container cannot hold water.) First, place the candles in their holders in the center of the pinholder, and then bend the line material into graceful curves of varying lengths. Pussy willow and Scotch broom are beautiful and easy to work with. Next, place this plant material at different heights, but keep it low in the design. Then place the flowers diagonally through the design. Use an uneven number of blooms (generally seven will do); they should be of one variety and vary in size. The quantity will differ according to the variety of flowers chosen. The flower stems should vary in height too, with the shorter ones in the center in order to bring the eye into the design. Subtly place some foliage that is in scale to the other plant material under the flowers. This will conceal the pinholder somewhat, but avoid using excess foliage to camouflage it. The pinholder will hardly seem noticeable if it matches or blends in color with the container.





There are many varieties of plant materials that can be used when designing arrangements for table settings. It's exciting to see what works with your appointments, and how many effects you can create. To attain unity, it is necessary that all materials be in proportion and scale to the entire setting. Large round decorative chrysanthemums, for example, are inadvisable because of their size and form. Other plant materials to avoid are those that are heavily scented, particularly eucalyptus, which many people are allergic to. In a confined area some odors become overwhelming and offensive.

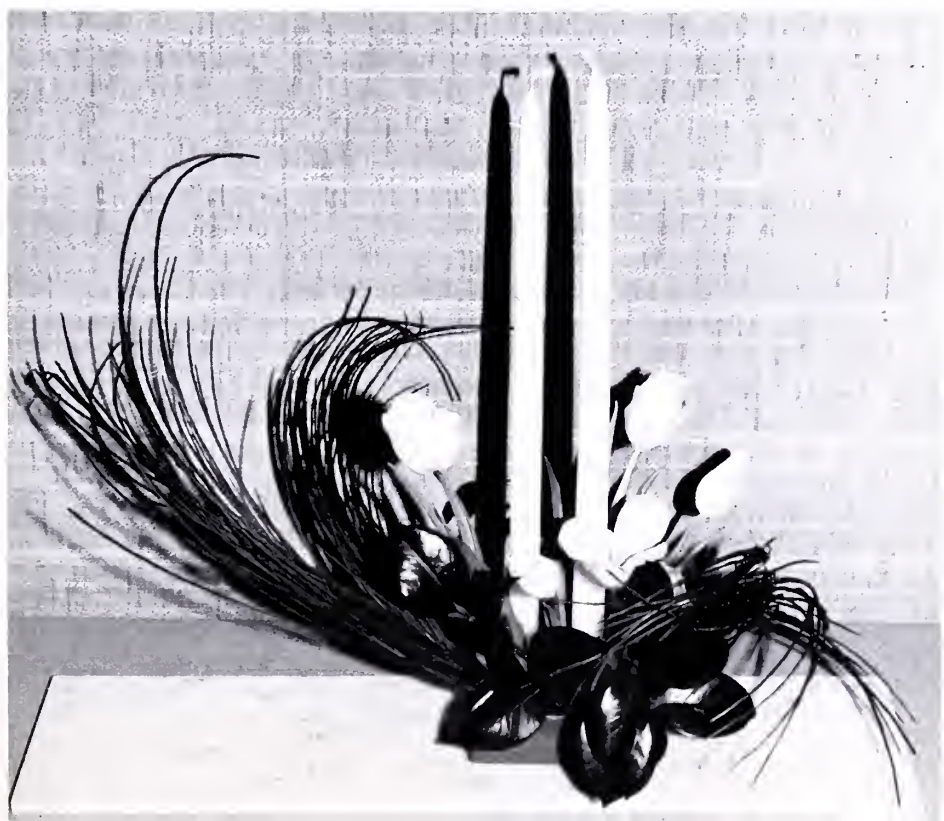
Designing flower arrangements for dining tables can be very gratifying, especially when the entire setting is admired. To thoroughly enjoy this experience, it cannot be done in haste. The decorative unit requires time to create; plan it in advance, condition the plant material and allow sufficient time to make the arrangement. If you are unhurried, the company, food and setting will be exhilarating. ❁

3 Steps in Making an Horizontal "S" Table Arrangement

Such an arrangement can be made on a board (a cheese board will do) or in a low container. When using a board or marble slab (as above), use a cup pinholder to hold the water. First, secure the candles in the pinholder, then bend the line material (Scotch broom) in graceful curves of varying lengths. Add the flowers (tulips) diagonally through the design. Then subtly place some foliage (camellia) that is in scale with the other plant material under the flowers to help conceal the cup pinholder.



Arrangement by Muriel Jaffe; photographs by Brenda Weisman



PERIOD ARRANGEMENTS

Georgia S. Vance

THE ARTISTIC DEVELOPMENT of the mixed bouquet in Europe and America demonstrates a welcome and enthusiastic acceptance of the beauty and bounty of nature and an enjoyment of a rich full sense of color. In each country temperament, taste and fashion modified the style of art prevailing in the period.

The baroque style originated in Rome at the beginning of the 17th century, spread throughout Italy, swept Europe and England and was carried to the Americas.

In 1638 a rare and remarkable book, *Flora—ouero Cultura di Fiori*, written by P. Giovanni Battista Ferrari, was published in Rome. Here is our first book on the art of flower arrangement. We catch the excitement and enthusiasm, not only of Ferrari himself, but of many other "noble young men," who were arranging flowers in the new style.

The *Dutch-Flemish Period* flower paintings of the 17th and 18th centuries are masterpieces of baroque art of such distinction as to have influenced flower arrangement to this day.

A close scrutiny of the work of Jan van Huysum, named "the prince of flower painters," might be a worthwhile approach to style and periods. Flowers of all seasons, painted with exquisite perfection and fidelity, were arranged in oval form to spill over the container and lie at the base. One imposing blossom always appeared high and off-center. Favorites for this position were *Fritillaria imperialis*, poppies, or the beloved tulips—Bybloem and Bizarre. We are reminded of Ferrari's suggestion to place "the noblest flowers" at the top, "where with playful quiverings they applaud their own beauty." So was the movement of the lazy S-curve begun to flow through the design. This line was carried by such popular kinds as peonies, roses, anemone,

lilies and iris. Some appeared deep in the design, others moved forward to give a third-dimensional effect, and still others reached into the outline. They were posed on their arching stems to lead the eye, to nod, to be seen in profile or from the back. Contrasting forms—hyacinths, tuberoses, sprays of apple blossoms, daffodils, primroses and buttercups contributed to the smooth rhythm or to irregularity in the silhouette.

Van Huysum's paintings possessed a warm glow, seeming to emanate from his usual terra-cotta urn. There is always a vibrant contrast of colors: subdued oranges, lovely blues, luscious pale pinks, rich golds and pearly white, set against green foliage of interesting textural quality. In addition to the overflow of flowers at the base, favorite accessories were birds' nests and grapes. The design was twice or more its height and overshadowed the container.

For those who enjoy having baroque exuberance held within bounds, "Flowers on a Window Sill" by Ambrosius Bosse is much appreciated.

To think of making an arrangement to illustrate the style of this period without spring flowers seems ridiculous. The true spirit cannot possibly be caught without tulips, poppies, and all the others. Inasmuch as flowers of all seasons appeared in the paintings, it was possible to select other kinds and proceed.

The *Louis XIV Period* in France (1643-1715) was one of overwhelming splendor with a magnificent court established at Versailles. Paintings by Blain de Fontenay show arrangements similar in composition to those of van Huysum but in resplendent bronze and gilded urns.

It is the paintings and engravings of Jean-Baptiste Monnoyer, a Flemish painter, that demonstrate the adaptation of the baroque style to the French taste.

A formal design in Federal style is composed of stock (*Mathiola*), Dutch iris, daffodils, freesias, poet's-laurel (*Danae*) and leucothoe.



Arrangement by Georgina S. Vance; photograph by Dennis M. Sutton

His portfolio of engravings, *Le Livre de Toutes Sortes de Fleurs d'après Nature*, contains exceptionally beautiful designs in fine classical vases and baskets. Their character of delicacy, elegance and formality could only be French.

The rococo style of the *Louis XV Period* (1715-74), a French original, was the artistic expression of an elegant and gracious manner of life filled with gaiety, charm and wit, for this was "the age of enlightenment."

Rococo arrangements were animated by a playful C-curve, becoming graceful and airy, often whimsical. Color harmonies were subtle, textures crisp and gleaming.

As seen in the engravings of Jean-Michel Moreau, le Jeune, fashionably styled flower arrangements were in scale with the rooms, now of comfortable size.

During the periods of *Louis XVI* (1774-92), the *Directoire* (1795-99) and *Empire* (1804-14), the classic revival style came into vogue. Captivated by antique forms through discoveries at Herculaneum and Pompeii, curves and flourishes were discarded to welcome straight lines, precise geometric forms and classical motifs.

In flower arrangements, vases were the most noticeable change—footed boat-shaped bowls, baskets tall and flaring and slender-footed urns.

In the portrait of Marie Antoinette by Mme. Vigée Le Brun, a lovely arrangement in a tall crystal vase with gold mountings is seen. Colors are pastel blues and pinks, gold and a touch of Chinese red so much favored in these periods. Here is a first appearance of spike-form flowers in the outline. (Continued)

The arrangement designed to illustrate this style was inspired by the flower paintings of Anne Vallayer-Coster (1744-1818). The container, with its Egyptian motif, the winged griffin, sets the period—Empire, of course. A bold massed effect with light colors and white in the center, dark mauve forms in the outline, and that touch of orange-red mark the arrangement with the stamp of this noted still-life painter.

In the *Early Georgian Period* in England (1714-60), the influence of the classic style of Palladio brought to the baroque dignity and stateliness, qualities more suited to the temperament of the English people. Rooms were luxuriously furnished, showing not only a taste for Italian, but also for Chinese arts, and toward the last of the period, for the rococo.

The English were noted for their love of gardens and flowers, and there was much interest in new plant discoveries, particularly in America.

A calendar of flowers series, painted by Jacob van Huysum, was similar in composition to those of his famous brother, Jan, but with an appropriate feeling of restraint. Here are flowers not previously seen: passion flower, pomegranate, monkshood, carnations and globe amaranth.

Fashionable containers were: Chinese porcelain, delftware, urns, ceramic vases of lovely shapes from the newly-established English factories and chalices of silver and pewter.

The *Late Georgian Period* (1759-1830) might well be called the Adam period for it was Robert Adam, from studies of ancient ruins in Italy, who brought the classic revival style into fashion in England. Formality, grandeur, symmetry and a harmonious relationship of soft colors were characteristics of the style.

Lovely garlands and baskets of flowers by Angelica Kauffmann appeared in wall paintings and in the designs of James Neilson seen in the Gobelin tapestries. Josiah Wedgwood produced many vases in Greek and Roman form or pieces with classical motifs which require no description.

Colonial America (1607-99) was not one culture; the Southern, New England and Dutch colonies were settled by people of vastly different ambitions and backgrounds. Each developed its own characteristics in the hostile new land in attempting to re-create a familiar pattern of living.

Flower arrangements for historical houses must be created of pure imagination and sympathy, remembering the stern Puritan spirit of New England, the love of flowers by the Dutch and ties to the English aristocracy in the South.

The *Colonial Georgian Period* (1700-80) was one of remarkable cultural and economic growth in which English influence was dominant. However, the styles prevailing in England were adapted by necessity, choice and spirit to satisfy the taste, ideals and way of life in America.

Because little information exists on flower arrangements, it seems that a step into the past might be helpful in interpreting the style. What better place than Colonial Williamsburg?

Louise B. Fisher began the tradition of placing floral decorations in the exhibition rooms, fresh flowers in summer, dried in winter and wreaths and garlands of evergreens at Christmas, as was done in England. Her book *An Eighteenth Century Garland*, gives an account of her research and work. It can be said that she created a style for her influence has been great.

The arrangement illustrating this style was created in the spirit of the period. It was not consciously designed according to rules of flower arrangement, but rather flowers from the field and the garden, and herbs were combined as a pretty decoration for a side table—not too formal and elegant in feeling, nor yet too casual. The container is a Williamsburg delft piece.

In the *Federal Period* (1789-1830), Thomas Jefferson was the chief exponent of the new classic revival style. So meager is the information as to how cut flowers were arranged that characteristics of the style itself must serve as a guide. Flower arrangements in slender, classic vases



William Sevecke

Sorghum, a seedling from Muriel Jaffe's bird feeder, with artichokes, okra, zucchini and Turk's turban squash.



Dennis M. Sutton

Georgia Vance's Early American bouquet in a delft vase is composed of field flowers and garden herbs.



Abstract design by M. Benz shows an interplay of shapes - - - the skeletal herringbone leaves of strelitzia, a contrived flower, and twined plastic.



William L. Klender

A line arrangement designed by Amalie Ascher consists of winged euonymus and mid-century lilies in a container with double Japanese baskets.



William Sevecke

A Christmas design by Guest Editor Muriel Jaffe features bird ornaments perching on weathered wood against a background of ever-green branches.



William T. Bode

Space is an integral part of Frances Bode's design, which features black calla (one of the arums) and madrone roots.

A small classical Rikka arrangement by Norman Sparnon. Diminutive chrysanthemums are traditionally used at the base. (Ikenobo School)





Dennis M. Sutton

Georgia Vance's traditional French design was inspired by flower paintings of Anne Vallayer-Coster (1744-1818).



Dahlia is a stabilizing force in M. Benz' configuration of painted roots and foliage.



Sydney Opera House is background for modern design by Sparnon. (Sogetsu School)



William L. Klender

Massed-line arrangement by Amalie Ascher has English ivy, geraniums and candytuft.



Brenda Weisman

Red gladioli with ti leaves add color to this Jaffe buffet table setting.

This arrangement in the style of the Dutch-Flemish Period uses many kinds of summer flowers rather than the tulips and other spring-blooming flowers so often used in that time.



Arrangement by Georgia S. Vance; photograph by Dennis M. Sutton

would be formal, precise and refined, with a controlled color harmony.

The *Romantic Period* or *Victorian* (1830-90), saw a continuing search for a style. Actually, there appeared a series of revival styles—gothic, renaissance, baroque and rococo.

Contrary to some earlier periods, information on flower arrangement is overwhelming and vases were produced by the thousands. Flowers and house plants were important in daily life and many of the kinds known today were grown. Inspiration was sought from the eagerly-awaited periodicals of the day, which were filled with a wealth of information to guide the hearts, minds and busy fingers of the ladies.

Today, the Currier & Ives bouquets are

found charming—round, full, tight masses with a fringe of delicate, nodding flowers and drooping foliage in footed urns of modified rococo style. And we view with sympathetic amusement, or a feeling of wonder, the skillfully wrought shell flowers or other fantasies under glass domes.

It should be remembered that the French painters of this period produced astonishingly beautiful flower paintings from a new perspective.

In the study of flower arrangement, two wonderfully illustrated, well-documented books by noted American authors prove invaluable. They are *Period Flower Arrangement*, by Margaret Fairbanks Marcus and *The History of Flower Arrangement* by Julia S. Berrall. ❀



Here is a close-up of the heart of a late summer arrangement, full of all the garden has to offer: purple ornamental kale; the berries of the European cranberry bush (*Viburnum opulus*) and beauty-berry (*Callicarpa dichotoma*); the spikes of red-purple buddleia and clusters of heliotrope contrast with the strong forms of dahlia, chrysanthemum and aster.

J. Barry Ferguson

*When to pick and how to condition
for long-lasting arrangements*

MAKING FLOWERS LAST LONGER

J. Barry Ferguson

DISCOVERING FLOWERS in a house always tells me something nice about whoever lives there; especially garden flowers simply arranged to reflect the seasons. A favorite rose held for attention in a pretty bottle or a gathering of twigs and leaves from a picnic outing can help bring a house alive. To this end I recommend a special cupboard set aside for flea-market bargains or attic treasures. It should include a good vase or two, antique baskets, slender flasks, ink-wells, mugs or seldom-used vegetable dishes; whatever is just right to hold the trophies from a country weekend.

Sources

As an inveterate and compulsive flower arranger I always strive to get the best

possible performance from my plant material, and I know it is simply a matter of where to get it and how well to treat it.

The garden is my primary source of flowers from earliest spring until well after the first frost, and I also include the gardens of friends for that something special. Here are materials that may often be difficult to find at a florist shop—silver and gray foliage of various kinds of artemisia and senecio; two of my favorite green-flowered annuals, nicotiana 'Lime Green' (free growing from seed and always in bloom) and zinnia 'Envy'; also alchemilla, eucomis and amaranthus—all with stems of any length desired, and with flowers of different sizes and angles. In addition there are reliable

masses of marigold, nasturtium and zinnia. In other words in a garden one can grow what one likes to arrange.

There are the wilds, too. Wherever they may be—country lane, seashore, deserted city lot, off the superhighway, or the back acres, there are treasures to be found. I gather branches of wild crabapple, grape vine and the naturalized Oriental bittersweet, seedpods and driftwood, as well as grasses and wild-flowers. Our native plants do require intelligent cutting, of course, as many are on state conservation lists and are better left undisturbed to bring pleasure in following seasons. However, black-eyed Susans, butterfly-weed and asters, for example, are common wildlings that offer wonderful flowers, and even their seedpods may be useful in arrangements. Provided clumps of these plants are left undisturbed, blooms can be cut in moderation. Why bother growing Queen Anne's lace, an elegant and valued addition to summer bouquets, when this naturalized European thrives so beautifully along our roadsides?

Wholesale markets or the local florist become important when you are city-bound; also during the winter, or when you need long-stemmed chrysanthemums, for example, or materials with a bold exotic appearance such as anthurium and strelitzia. Get to know your florist and consult him early if you are after the unusual. He has to order, too. He may also



Drawings by Francis G. Dearden

Branches from the garden or the wild are usually improved by selective pruning to "reveal" the essential or beautiful line needed for your design. Look for these flowing, rhythmic curves in branches from the base or the back of a shrub.

suggest the best lasting items throughout the year. A best buy (and available almost anytime) is the so-called pompon chrysanthemum. Also, the daisy-type, especially the white and yellow flowered variety, 'Marble,' and 'Tuneful' (copper with green eye), are reliably long lasting. They have good individual stems which can be broken down easily for smaller bowls. Tulips in season and mini carnations are also good value.

Picking

Late in the day, or first thing in the morning, is the best time for gathering flowers. The sap is high then, and the food content in blooms and leaves is at its peak. Take along a sharp, short-bladed knife, sharp pruners (for woody stems and roses), a few rubber bands, and a pail of tepid water if the day is dry, as well as the basket. Tender material should be placed in water at once; individual stems can be taken out and treated later. With small flowers such as sweet pea, marigold, lavender, lily-of-the-valley, or daisies, pick all of one kind at a time, as a bunch, and slip a rubber band around the stems for easier handling. Woody or semi-woody stems (*e.g.*, chrysanthemum) are best snapped



Carry rubber-bands in your pocket whenever you go collecting: gather all one variety at a time and make neat bunches with stem ends together to save excessive handling.



Semi-woody perennials, such as chrysanthemum, delphinium and peony and some flowering shrubs, such as lilac, respond quickly and last longer if their stems are dipped in boiling water for 10-50 seconds. Keep flower heads clear of the steam.

off rather than cut when you are picking. Roses are appropriately gathered in a shallow basket, ready for handling indoors. Experience teaches best at what stage of development flowers should be cut. As a rule, what can be described as an advanced flower bud, or a nearly mature bloom, is the best candidate. Outer petals or lowest flowers on a spike should be fully developed. Centers of daisy-type blooms should still be immature, while peonies, roses and poppies should be gathered in the loose bud stage.

Treating and Conditioning

Old-wives' tales persist, but few are effective when it comes to the care and treatment of cut flowers. More important points to remember are:

Cleanliness—of all containers, holders and water in the vases.

Conditioning time—all gathered flowers should rest overnight, or at least some hours before using, in a cool, preferably dark area; (flowers from the florist are almost always pre-conditioned and need only an inch cut from the stem ends).

Here are different groups and how they may best be treated.

Soft Stems: including the great bulk of summer annuals (marigold, cornflower, geranium, nicotiana, daisies), most

bulbs (daffodil, hyacinth, gladiolus), and all weeds and herbs. They require nothing more than the removal of any foliage which might occur below the water level, and a fresh sloping cut before arranging. Tulips should have the heavy white part of the stem near the bulb removed and the bottom of the remainder split up for 2 inches before conditioning. Roll the stems loosely in newspaper to straighten if needed.

Semi-woody or Hard Fibrous Stems: including the border perennials that are the staples of summer arrangements (hardy asters, goldenrod, chrysanthemum, echinops, peony, helenium, butterfly-weed). Split the ends of stems and stand them in boiling water for 15 to 25 seconds before conditioning in deep containers of tepid water.

Woody Branches: examples are lilac, flowering branches of fruit trees, forsythia, mock-orange. Remove unwanted branches and leaves. Scrape the bottom 3-4 inches of the stem, then split the stem end for 2-3 inches before conditioning. With lilac, it is important to remove the greater part of foliage if the flower panicle is to survive. If in any doubt, or if the weather is hot, scald the stem ends in boiling water for two minutes and watch the wilted blooms revive.

Bleeding Stems: some campanulas, all euphorbias including poinsettia, and oleander and poppy. One alternative is to sear the stem end as quickly as possible with a candle flame, or over a gas stove jet, until quite black, or scald stem ends in boiling water for 2 to 3 minutes, before conditioning in tepid water. Take care to protect the flowers and lower leaves during the treatment. Wrap in a towel or newspaper if in doubt.

Hollow Stems: including hollyhock, delphinium and dahlia. Either treat stem ends in boiling water as semi-woody perennials or stand them in warm water (100° F) until cool.

Forcing

One of the pleasures of spring is antici-

When cutting woody-stemmed material, such as fruit trees or flowering shrubs (lilac, mock-orange), remove unnecessary foliage and scrape the bark from the lower 3-4 inches of the stem before conditioning. Split rather than crush the stem ends.



pating it, especially if you can enjoy a branch of dogwood or cherry indoors while it's snowy outside. When selecting branches, consider the tree or shrub first and prune judiciously. Interesting twisted branches frequently occur on the lower part or rear side of the shrub, where they won't be missed. Or, prune in a way that will cause the tree to branch, cutting directly above an out-facing node, with a sloping cut.

Bring in branches anytime in late winter or spring when buds are well formed. Allow 3-4 weeks for fruit trees and dogwood to bloom, much shorter in the case of forsythia and flowering quince. Simply remove low twigs, scrape the end of the stem for 3-4 inches, and then split lengthwise for 2-3 inches before placing the branches in amply large containers of cold water. Put them in a bright room with temperature from 65° to 70°. Add charcoal to the water to prevent odors, keep the water level topped up, and mist the branches preferably twice a week to stop the buds from drying out. The opening flowers will be paler than in nature, but colors will deepen if the branches are brought to a sunny window.

Making It Last

Having gone to the trouble of combining all the elements that add up to your finished arrangement, it is sad to see it languish and fade in the hot dry air of many dwellings. If you have a cool

unused bedroom, back porch or even a garage where flowers can be stored overnight, they will last much longer. It is not necessary to change the water every day, but do see that the level is topped up with fresh water daily. A few pieces of charcoal in the water will keep long-lasting combinations of flowers and foliage in better shape, but most important, see that no leaves or flowers are caught below the waterline to decay and hasten bacterial contamination.

Finally a few tips. A straw or toothpick inserted through the center of a zinnia will stop the flower nodding over in the middle of your efforts.

Keeping flowers in a home refrigerator may do more harm than good because of excessive drying. A florist's refrigerator has air circulation and humidity to prolong the flower-keeping qualities, but once the flower comes into normal room conditions the refrigerated flower usually gives out first.

Hydrangea, long-stemmed roses, rhododendron and peony often benefit from a conditioning bath in warm weather. Place them full-length, flowers and all, in the bathtub for two hours before arranging.

Depth of water in the vase is not important once the material is properly conditioned. As long as the treated area, the lower 3-4 inches of the stem, is covered with cool clean water the flower should live out its normal span. ❀

AN ARRANGER'S GARDEN OF TREES AND SHRUBS

Ferderick McGourty, Jr.

FLOWER ARRANGEMENTS give extra dividends in pleasure if you grow some of the plants for them around the yard. Frequently, the materials used in indoor designs are excellent landscape subjects, and it's no problem to include choice ones when designing or redesigning the home property. Let's here discuss trees and shrubs, which form the backbone of any garden.

Primarily for Flowers

Eastern flowering dogwood (*Cornus florida*), one of the most beautiful small trees, needs little description for gardeners or arrangers. It is a quadruple-purpose plant for arrangements. The white or pink notched floral bracts are attractive over a fairly long period in spring. In summer the leaves are a bright leathery green. Red autumn foliage and fruits rank with the best, and winter buds and branches have "architecture."

Gardeners in cooler, humid parts of the West Coast have a similar esteem for the Pacific dogwood (*C. nuttallii*), a larger-growing tree which often repeats bloom in late summer and has red fruits somewhat resembling arbutus. Like many species originating west of the Rockies, it does not thrive in the East. The Japanese dogwood (*C. kousa* and variety *chinensis*) is more adaptable in cultivation than the eastern or Pacific, and it blooms in late spring, a full month after *C. florida*. Its white floral bracts are pointed and the fruits are strawberry-like. All of these dogwoods are essentially acid-soil plants, growing best in a deep loam with plenty of leafmold.

Magnolias are prized in arrangements for flowers, foliage and winter branches or twigs. Star magnolia (*M. stellata*), a small multi-stemmed tree or shrub with delicate, scented white blossoms in early spring (provided frost has not marred them), is choice in winter designs because

of furry buds. The well-known saucer magnolia (*M. x soulangiana*), available in several color forms, is also of use. Southern magnolia (*M. grandiflora*), a splendid evergreen tree that is most safely grown in mild areas—though an occasional specimen is seen in the New York City area—offers the arranger deep, lustrous green leaves, often with dense, rusty tomentum on the undersides. The large, highly scented flowers are, like lilae, best displayed indoors in a well-aired room or vestibule.

Many kinds of spring-flowering roseaceous trees, especially ones with long-lasting double flowers—as often occur in named varieties of erabapples, Japanese cherries and certain hawthorns (e.g., 'Paul's Scarlet'), provide good material for arrangements. Single-flowered, short-lasting but charming in designs is the shad-blow or serviceberry (*Amelanchier*). These distant arboreal relatives of the garden rose require a sunny, roomy, well-drained location for best performance, although serviceberry performs well in part shade. They are not always pest-free by any means, but some disease problems may be lessened by avoiding frequent use of high-nitrogen fertilizer.

Often a garden will already have a wealth of the common spring-flowering shrubs that are useful for indoor designs—forsythia, flowering quince, lilacs, flowering almonds and various spireas. These are of easy culture in a well-drained, sunny location. In acid-soil areas, which is to say most of the East and Pacific Northwest, rhododendrons and azaleas (botanically a kind of *Rhododendron*) in their numerous color forms are good subjects not only for flowers but for their leaves.

Actually spring takes blooming good care of itself without the arranger going to great pains to improve it. In the cooler regions roughly eighty percent of

Evergreen azaleas, which bloom in spring over a long period, often resemble giant bouquets with their masses of flowers set off by irregular branching habits that act as the "lines" of these living arrangements.



Marjorie J. Dietz

our flowering shrubs and trees put forth their display within a six-week period in spring. In summer our attention turns to annuals and perennials for flowers, although the airy tamarisk and vitex are helpful shrubs then. Autumn brings excellent colors to many native woody plants (maples, oaks, sassafras, sourwood, sweet gum, sour gum) and to a lesser number from other lands (Japanese maples, many euonymus). There is an abundance of fruits in the traditional harvest season, too. But, what about winter—and your garden?

For Winter Arrangements

In the Middle Atlantic states the flowering season begins in January with the Oriental witch-hazels (*Hamamelis mollis*, *H. japonica* and their hybrids), of which the small spidery yellow, gold, orange or red blossoms are long effective in the garden and in indoor designs. The true Chinese witch-hazel (*H. mollis*) is fragrant. The branching pattern of all witch-hazels is interesting, too, and cut branches are very useful in simple arrangements.

Heath (*Erica carnea*) is winter- or early-spring flowering, with tiny bells of pink, red or white, depending on the variety. There are many cultivars, bright pink 'King George' being one of the first to bloom. These low-carpet, acid-soil plants require good drainage and at least

half a day's sun. Heath seems to thrive best in coastal regions, as on Cape Cod and in the Northwest. A good shearing after bloom increases plant longevity. The blossoms are ideal for small bouquets at a time of year when little is to be had from the garden. The needle-like foliage is of interest, too.

The latter part of winter brings winter jasmine (*Jasminum nudiflorum*), which resembles a green-stemmed forsythia, the Cornelian-cherry dogwood (*Cornus mas*) with its small yellow "undogwood-like" blossoms, and winter honeysuckle (*Lonicera fragrantissima*). None of these shrubs would attract the eye if they were to bloom in midspring, but they have considerable value in off-season arrangements, as does the slightly showier Korean-spice viburnum (*V. carlesii*), which is basically an April bloomer in much of the Northeast.

Shrubby willows have a place in many arrangements. They perform well in soil of average drainage, but if a low spot is available they will grow better there than most other shrubs. The commonest are the European goat willow (*Salix caprea*) and the American (*S. discolor*), both of which are called pussy willows. Fan-tail willow (*S. sachalinensis* 'Sekka') is a novelty grown for its flattened (fasciated) twigs and twisted "pussies." It is highly regarded by some arrangers, as is the

ornamental hazelnut called Harry-Lauder's-walking-stick (*Corylus avellana* 'Con-torta'). The latter, an oddity with cork-screw branching, is liked very much by people who are taken with that sort of thing. Best see both in a nursery first, consider their final placement in the garden, then go home and think again. Harry is a showman and demands a specimen location because he is so distinct from other shrubs, but the fan-tail can be lost along a brook or in a remote part of the garden until cut material is needed for winter display.

The winged euonymus (*E. alatus*) is a magnificent shrub for flaming autumn color and conspicuous winter twigs. It's a large growing sort, and the corkiness of the branches varies from plant to plant. One suggestion is to seek out the cultivar 'Monstrosus', which is very corky; or see seedling nursery plants before purchase so you get one that has nicely winged twigs. Avoid the cultivar 'Compactus', which makes a tighter, more symmetrical shrub but doesn't have pronounced wings.

Brooms (*Cytisus scoparius* and hybrids) are valued in the winter garden for arrangements because of their green shoots, which do in fact look broom-like. The yellow-to-red-and-purple pea-like flowers are attractive in spring, too. Sharp drainage and sun most of the day are necessary for these shrubs to endure over the longer term.

Broad-leaved Evergreens

All arrangements need foliage, and these plants are among the most useful the designer can grow. The flowers of some broad-leaved evergreens, such as camellias (hardy with winter protection to Long Island), pieris (the "andromeda" of gardens), rhododendrons and mountain-laurel are often striking. Cherry-laurel (*Prunus laurocerasus*) is less so. Others, for example, holly osmanthus, aucuba, Fortune's euonymus and certain true hollies (Chinese, English and American), are foliage plants. Most are not averse to shade in the colder months, particularly in the North where winterburn is

common. Oregon grape-holly (*Mahonia aquifolium*) demands winter shade to prevent leaf burning.

Drooping leucothoe (*L. fontanesiana*; formerly *L. catesbaei*), an acid-soil shrub growing to 5 or 6 feet, is one of the best for foliage, which turns bronzy in autumn, and the white flower bells have a modest charm in spring. *Vaccinium ovatum*, the "huckleberry" of florists, is from the Northwest and is not recommended for eastern gardens because of its dubious hardiness.

Cotoneasters, not all of which are evergreen, are worth including in such a garden. The deciduous rockspray (*C. horizontalis*) has a herringbone branching pattern. Its small glossy leaves turn rich red or orange in autumn. *C. microphylla*, available in several varieties and hybrids, is evergreen, though winter injury may be expected in the North.

An entire Brooklyn Botanic Garden Handbook (No. 22 in the series) is devoted to broad-leaved evergreens, and the foliage arranger should consult it for further ideas. The choices are indeed varied, including the dainty woodland ground cover from the southern Appalachians, *Galax*, which can survive New England winters with a little protection. So beloved is this plant that a town in Virginia has been named for it. There is also English ivy (*Hedera helix*), which has a myriad of forms. Some of the smaller-leaved sorts are worthy of the arranger's garden experiments, particularly in the mid-Atlantic states and on the West Coast. They vary in winter hardiness, and the more tender ones can of course be treated as house plants.

Finally, don't be too quick to dismiss Japanese pachysandra, the rough-and-tumble ground cover known to all northern gardeners. Try it in an arrangement and see how refined it can be. You may not even recognize it on a closer look. This is true of many garden plants, whose leaves or flowers assume a totally different dimension when brought indoors. Apart from their design possibilities, it's an excellent way to get to know them better. ♣

An arrangement of artichokes, green bananas and peppers with the foliage of sansevieria and *Dracaena sanderiana*.



*Arrangements by Muriel Jaffe;
photographs by Brenda Weisman*

For fun and a challenge

DESIGNING WITH FRUITS AND VEGETABLES

Muriel Jaffe

WITH FRUITS and vegetables, you can create a bold pattern, a beautiful rhythmic arrangement with flowers, or a delectable presentation of cut fruits. It is the plant material you choose that helps determine the design.

Strong structural forms—acorn squash, zucchini, artichokes, frying peppers, fresh okra pods on the stalk—combine well with certain kinds of foliage, for example, English ivy, sansevieria, pothos or *Dracaena sanderiana*. Most flowers are overwhelmed in an arrangement of such vegetables, but they can be very attractive when displayed with less dominant plant materials—grapes, small bananas, 'Seckel' pears, 'Lady' apples, nuts and

various foliage, including that of geranium, leather-leaf fern, galax or English ivy. Use some of these in combination, but not necessarily all of them together. Frying peppers may be combined with flowers, as may strawberries and cherries. If a fruit or vegetable seems too dominant, subtly cover part of it with foliage and it will appear less bold.

Take into consideration the perishable quality of plant material and the desired duration of the arrangement. Avoid over-ripe produce—it may attract flies and develop offensive odors. Choose what is compatible with the total design in size, color and texture.

Grapes are wonderful transitional ma-

terial when arranging with fruits or vegetables, but don't use too many of them—just enough to complement the design, and then only one color of grape. Combining colors of grapes often breaks the rhythm of the design; dark colors are much heavier visually than light ones. Green grapes are generally preferable because they blend with most plant materials. However, I occasionally use black ones with 'Bluc Chip' pompon chrysanthemums, heather and the mauve winter foliage of English ivy in a pewter or silver container, or red grapes with any brown, glycerine-treated foliage that is in scale, dried golden yarrow, 'Lady' apples and nuts, when this blends with the intended color harmony. A bunch of grapes helps create unity in design through repetition of form. Unity is essential to good design and is created by repetition, gradation and contrast.

For a dynamic effect, use more than one of a variety, except strongly dominant vegetables such as flowering kale and cauliflower. An example of attractive repetition of form is to place zucchini so that all tops are up, or to keep bananas in a bunch as they grow. By placement in groups, an impact is created in the design. When there is a separation of like elements particularly involving color, the flow of the design stops. Gradual change in color, form and texture continues the rhythm. However, there should be some contrast, especially in form and texture, for interest. Apples in a basket may be abundant and luscious, but these same forms presented in this manner lack variety and contrast. Use unequal amounts of fruits and vegetables: two of one variety, three or more of another.

Balance must be given careful consideration in this type of arranging because of the actual and visual weight of the elements. Space can balance plant material; it works well for the design and the designer. It allows the beauty of the plant material to be seen, thus giving strength to the design. Even in an arrangement of abundant fruits or vegetables, utilize space by not filling the entire basket, burl, board or container:

allow the arrangement a "breathing quality." When working with actual balance, use unlike objects on either side of the axis that have equal visual weight, but in different amounts.

I've written of actual and visual balance, but how is working balance achieved when designing with fruits and vegetables? Many of these designs are constructions *i.e.*, they are developed along the lines of building one object upon another. Mechanics, especially a heavy cup pinholder, are required to hold the heavier objects in place. Cut flowers and foliage may be kept fresh in small cup pinholders or plastic tubes and should be concealed, particularly the tubes.

Sticks are necessary to secure some of the plant material. Any sturdy sort, about 1/4 inch in diameter, will do. Hyacinth sticks are a good choice because they are strong, readily available and can be impaled in the pinholder after a cross cut is made at the blunt end. Cut the sticks to the desired height, remembering to keep them varied, and cut a point at the end to be inserted in the plant material. Hyacinth sticks may be purchased at a garden supply shop. The only possible disadvantage in their use is that some of the green coloring may come off where inserted. However, after the arrangement has been dismantled and when the vegetables are being prepared for cooking, these areas can be cut away. Among the benefits of arranging with fruits and vegetables are the recipes exchanged with guests. As your selection of plant materials expands, so will the recipes.

Grapes that are elevated in an arrangement may look as though they are resting gently on the lip of the container, but in fact are secured with wire to a pick or V-forked stick that is impaled in the pinholder. Picks with wires attached may be purchased at flower arranging shops or at some florists. Cross cut the bottom of the stick, as previously mentioned.

To mound strawberries or other small fruits, use toothpicks with rounded sides. Insert one point into the fruit and join it at the opposite end with another fruit.

An arrangement of glycerine-treated beech leaves, dried yarrow, 'Lady' apples, red grapes and Brazil nuts and filberts. The stoneware container was made by Muriel Jaffe who also created the arrangement.



Make sure the fruits meet in order to conceal the pick. By using toothpicks, it makes designing easy and keeps the fruits from rolling. Several may be attached this way to achieve the effect you desire.

The play with color in this type of arranging is fascinating to the arranger and enchanting to the viewer. It's a challenge to blend, contrast and match colors of flowers, fruits, vegetables and foliage. The colors of chrysanthemums are vast and exciting; they may be bold or subtle from a brash chrome yellow to a timid pink. There are flowers of rust and gold combined that blend with autumn foliage, seasonal fruits and nuts. The daisy and pompon varieties are probably most advantageous because of their size and form. Choose any flowers you like, but do keep size and form in mind when making a selection. Start with either fruits or flowers and then work all elements into the total design.

Sometimes it may be necessary to carry a fruit or flower to the source of its design counterpart for a desired color harmony. I remember doing this once after filling a glass bowl with water-

melon wedges. The wedges were 2 or 3 inches wide with the rind removed. The arrangement needed something to give it a special quality, but what? With wedge in hand, neatly wrapped in foil of course, I proceeded to the florist. After much searching, the perfect combination became clear—salmon pink anemones. I placed three anemones at different heights with some foliage of the leather-leaf fern (*Rumohra adiantiformis*) in a wedge at the side near the lip of the bowl. The result was delightful!

A good point to remember is that there is enough moisture in cut melon to keep flowers fresh. Also, white tuberous begonias with their own foliage and cut watermelon are dramatic when the table is set with white linen. Experiment, be adventurous, try different combinations of plant materials, and you will find designing with fruits and vegetables decorative and delicious!

Note: The Handbook for Flower Shows (National Council of State Garden Clubs) recommends that no cut fruit or vegetable be incorporated in arrangements for flower show competition. Create these designs for enjoyment in your own home. 🌿

AN IKEBANA PRIMER

Norman Sparnon

IKEBANA as we know it today owes its origin to the formalization of the classical Rikka style or arrangement in the fifteenth century. Rikka, meaning standing flowers, had evolved from a simple Buddhist floral offering which had been introduced in the Ikenobo School in the seventh century.

Later, successive Ikenobo masters developed twenty-nine styles of Rikka, which now form the basis of the Ikenobo

School and all other styles of Ikebana. The styles are the Seven Forms of Study, the Nineteen Styles and the Three Forms of Advanced Study.

Toward the close of the seventeenth century, with a shift in power from the military to the merchant class, a simplified version of the massive Rikka was introduced. It utilized only three primary branches as against the nine primary branches used in Rikka. This new style embodied the dignity of the Rikka with the simplicity of the tea flower arrangement which had developed as a necessary adjunct to the tea ceremony. Often referred to as the *Ten, Chi, Jin* (heaven, earth, man) style, it offered infinite possibilities in the placement of the three branches, and many new schools of Ikebana developed. This style is known in the Ikenobo School as *shōka* and in other classical schools as *seika*. It also provides the basic approach to a study of classical Ikebana.

Classical Ikebana

The principles outlined here are those of the Ikenobo School. The fundamental principles of classical Ikebana are based on three primary branches of unequal lengths asymmetrically placed to give a strong third dimension.

Termed *shin* (spiritual truth), *soe* (supporting) and *tai* (substance), they are the counterparts of *shin*, *soe* and *nagashi* of the Rikka, the tips of which when joined together by an imaginary line form a scalene triangle. This is the triangle on which all asymmetrical styles of Ikebana are based.

In *shōka*, the height of the *shin* (primary) may be from one and one-half to three times the height or width of the container. The *soe* (secondary), when arranged, is two-thirds the height of the *shin* and the *tai* (tertiary), one-third the

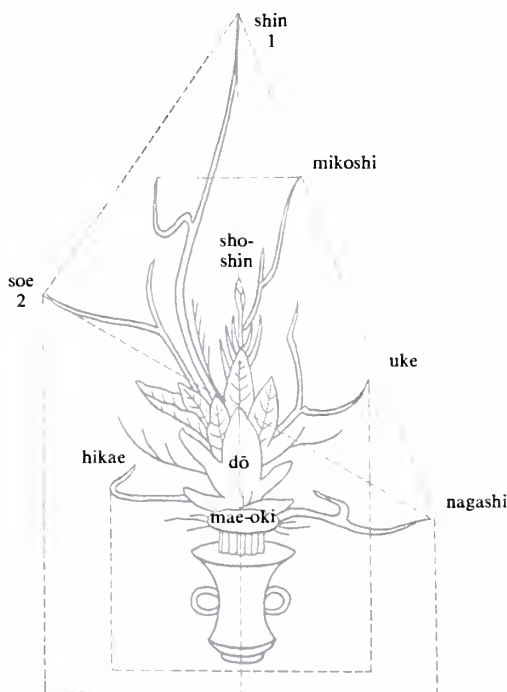


Diagram illustrating how all branches of a Rikka arrangement conform to the height of the *shin* according to an established pattern of proportion. Points 1, 2, and 3 when joined by an imaginary line form a triangle whose sides are unequal.

height of the *shin*.

The three primary branches may be supported by supplementary branches, but they should never be longer than the branch they support. In short, if the tips of any three branches are joined together by an imaginary line they should form a sealene triangle.

The *shin* branch should curve either to the right or left depending on whether the arrangement is a right-hand or a left-hand one. If the branch is divided into five equal parts, it will be found that the maximum curvature falls within the second-fifth from the bottom. The top of the *shin* should be in line with its base and the outer limits of its curve should not extend beyond the outer edge of the container.

The placement of the *soe* or secondary branch is indicated by the curvature of the *shin*. If the *shin* curves to the left the *soe* is placed to its left rear, and if to the right then it is placed to the right rear.

The *tai* or tertiary branch is placed to the left or right front of the *shin* diagonally opposite to the *soe* and at an angle of approximately 45 degrees oblique to the viewer. That is to say, an imaginary line drawn from the tip of the *tai* through the *shin* to the *soe* would be approximately 45 degrees oblique to the viewer.

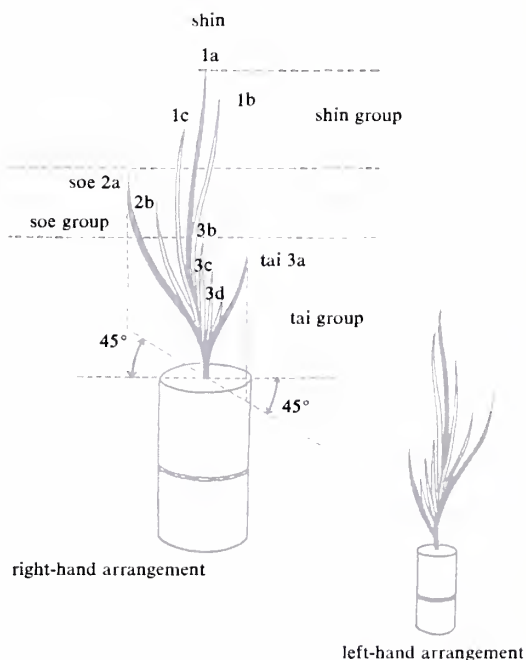
The arrangement should rise as a single unit for approximately four to five centimeters (about three-quarters of an inch) above the lip of the container before expressing its form. This is known as the *mizu-giwa* (water's edge) and is the critical area of the arrangement. It is analogous to *pointe* work in classical ballet.

The three branches are held in position in the container by a forked twig known as *matagi* or *hana-kubari* and a cross-bar known as *ichi-monji*. Although this is the most effective way for holding the branches or flowers firmly in position it is common practice nowadays to use a needle-point holder for certain materials.

In traditional *shōka*, materials are ar-

ranged alone (as one iris, aspidistra, chrysanthemum or peony) or in combination of two (such as pine and chrysanthemums, broom and roses, or willow and camellias). Exceptions to this rule are the triple combination of the pine, bamboo and plum blossom; triple combinations in the two-level bamboo container known as *niju-ike* and the seven grasses of Autumn.

Flowers such as chrysanthemums, roses, peonies and gladiolus may be arranged alone, but non-flowering material such as pine, weeping willow, juniper and eypress, is not (as a general rule) arranged alone. An exception is the aspidistra leaf. It is common practice for



Branches in a *shōka* arrangement. 1 The *shin* group, consisting of 1a *shin*; 1b *shin-no-ushiro*, to the right rear of the *shin*; and 1c *shin-no-mae*, to the left front of the *shin*. 2 The *soe* group, consisting of 2a *soe*; and 2b *soe-uchi*, slightly to the rear of the *soe*. 3 The *tai* group, consisting of 3a *tai*; 3b *tai-no-shin*, inclining slightly to the front of the arrangement; 3c *tai-oku*, slightly to the rear of the *tai*; and 3d *tai-no-mae*, to the front of the *tai*.

non-flowering branches to be combined with flowers. In this case the branches are used for the *shin* and *soe* and the flowers for the *tai*. This group of flowers is known as the *nejime*.

The most fundamental of all *shōka* arrangements is an arrangement of five aspidistra leaves. The leaves may be arranged in odd numbers from five to fifteen leaves. In this arrangement the basic principles of all classical Ikebana are expressed—asymmetrical balance, the third dimension and the principles of *Yin* and *Yang*, the negative and positive principles of Oriental philosophy. The perfect balance of these two aspects provide one perfect whole—the ultimate goal of every good Ikebana arrangement.

Classical Rikka and Modern Ikebana

Classical Rikka expresses the grandeur and majesty of nature and is the origin of all Ikebana. Magnificent in its concept, it is a vast and complex study. In the total world of flower arrangement, Rikka provides the arranger with the real, great challenge of nature.

There are no simple rules to the study of Rikka. A new student must first study *shōka* and after achieving a certain level of efficiency, may receive a diploma authorizing its study.

Basically Rikka is designed to create a globular three-dimensional effect utilizing seven to nine branches which radiate at approximately 45 degrees from the core of the sphere.

The 29 traditional styles which form the basis of Rikka were evolved over a period of centuries by great masters and have their parallel in the vast repertoire of great classical ballet renowned for its graceful lines and *pointe* work.

Modern Rikka, like modern *shōka*, permits considerable freedom in the use of materials and containers and also encourages creativity. However, the original concept of the grandeur of nature is still retained. Today small Rikka, completely suitable to contemporary living, has also been devised.

Although modern Ikebana has its roots in classical Ikebana, it is now practiced as

a formative art completely free of its parent body.

It owes its development to the introduction of western plants and flowers into Japan following the Meiji Restoration in the 19th century. Classical Ikebana, although extremely beautiful, was governed by rules which restricted the arrangements to the then available flowers. An endeavor was made early this century to introduce new materials into the classical styles by Unshin Ohara, then an Ikenobo master. In an attempt to overcome the rigid rules governing classical work, he devised a new shallow container based on those used for dwarfed trees and tray landscapes and established a school of his own, since known as the Ohara-ryu. This was the origin of the *moribana* style of arrangement, a style which allowed greater freedom in the selection and combination of flowers. From this style arose the much freer *jiyu-bana* (free arrangement) of the Showa era (1926 to date).

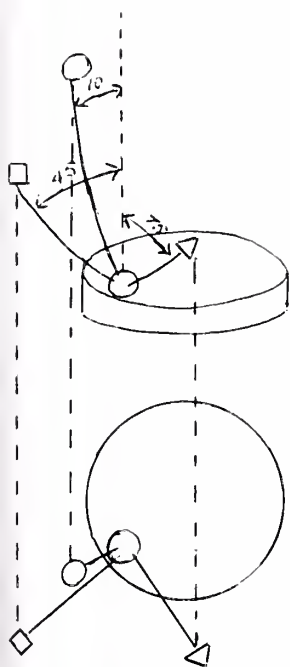
Sofu Teshigahara, who founded the Sogetsu School in 1926, was to prove the great stimulating force in the new trend to greater freedom in Japanese flower arrangement. Under his leadership, Ikebana was lifted from the *tokonoma* into every facet of Japanese living. Now completely original in its conception and unlimited in its scope, it thrives as a living art.

Modern Ikebana may be classified into three categories, *moribana*, *nageire* and free expression. It should be noted here that irrespective of the style practiced, whether classical or modern, the basic principles of asymmetrical balance and the third dimension remain unchanged.

Basic Moribana

Moribana, meaning heaped-up flowers, differs essentially from the classical styles. Whereas classical arrangements rise as a single unit from the lip of the container, *moribana* rests on the lip or at lip-level of the container.

The basic principles outlined here are those of the Sogetsu School. There are two basic styles—the basic upright and the basic slanting. Variations are made on these two styles.



Arrangement by Norman Sparrow
 A basic upright arrangement of chrysanthemums showing the placement of the three primary branches with two supporting flowers. Diagram showing the upright style is at left.

As in classical work, there are three primary branches: the *shin* (primary branch), the *soe* (secondary branch) and the *hikae* (tertiary branch). The various schools differ in the names given to these three branches.

The length of the *shin* branch may be from one to two times the length plus the depth of the container.

The *soe* branch is three-quarters the length of the *shin*.

The *hikae* is three-quarters the length of the *soe*.

There may be any number of supporting branches or flowers as dictated by the by the size and style of the arrangement.

A needle-point holder is used to hold the material in position and an arrangement may be made in either the left-hand or right-hand style. A right-hand arrangement is when the *shin* and the *soe* incline toward the viewer's left and the *hikae* to the right. For a left-hand arrangement the branches are reversed.

For the basic upright style the needle-point holder is placed to the left or right front of a wide-mouthed shallow bowl.

The *shin* inclines at an angle of from 10 to 15 degrees toward the left shoulder.

The *soe* inclines at an angle of approximately 45 degrees toward the left shoulder.

The *hikae* inclines at an angle of approximately 75 degrees toward the right shoulder.

Any number of supporting branches or flowers may be used. However, they should not be longer than the primary branch they support.

For the basic slanting arrangement, the positions of the *shin* and the *soe* are reversed and the needle-point holder is placed to the left or right of the bowl.

As with classical work, flowers such as roses, chrysanthemums, gladiolus and carnations may be arranged alone. Non-flowering material is seldom arranged alone. Common practice is to combine non-flowering branch material with flowers—such as pine and roses, eucalyptus and carnations, weeping willow and chrysanthemums. When non-flowering branch-

es and flowers are combined the basic rule is to use the branches for the *shin* and the *soe* and the flowers for the *hikae*. Irrespective of the material or style, certain basic principles should be noted.

1. The flowers should look up as though growing towards the sun.

2. The arrangement should have a strong third dimension.

3. The arrangement should have a "growing" feeling.

4. The natural character of the material should be expressed in the arrangement.

5. The arrangement should be endowed with feeling.

Basic Nageire

Nageire from the verb *nage-ireru* (to throw or fling into) is defined as a vase arrangement. It has a spontaneous, casual feeling and is probably one of the most beautiful of the Ikebana styles. In place of the needle-holder used for *moribana* arrangements, various artifices are employed to hold the branches in position.

For good balance the length of the *shin* or primary branch is from one to two times the height plus the width of the container. The *soe* or secondary branch is three-quarters the length of the primary branch and the *hikae* or tertiary branch is three-quarters the length of the secondary branch.

In common with the *moribana* arrangements, there are two basic styles—upright and slanting, with the branches and flowers being arranged with a similar strong forward movement. For tall arrangements, the primary branch may cascade down the vase.

Combinations of materials are the same as for *moribana* arrangements.

A good *nageire* arrangement should have a beautiful flowing feeling.

The diagrams on the facing page indicate the various artifices used to hold the branches or flowers in position.

Free Expressions

Free expression does not mean freedom from basic principles. The basic principles of placement in both *moribana* and *nageire* are infinite in their application,

and the principles of asymmetry and the third dimension inherent to all good Ikebana are but a few of the principles necessary to be mastered before any successful free expression can be accomplished.

In modern Ikebana—as with any creative art form—there is no restriction in the use or combinations of materials. For many years, modern Ikebana has encompassed sculpture, mobiles, wall reliefs and unpromising materials such as iron,

brass, stone, glass, vinyl and plaster of Paris, previously unheard of as ingredients for flower arrangements. It is the basic principle of Ikebana and the stimulating force of an awareness of nature which guide the Ikebana artist to his ultimate creative goal.

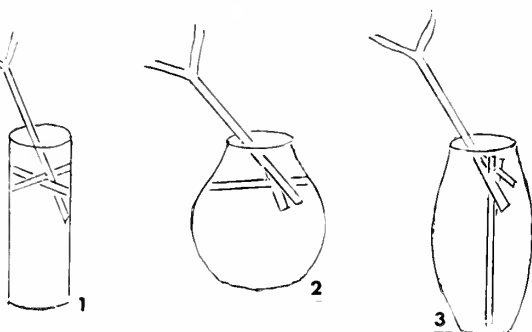
As a final note to this primer, it should be mentioned that in good Ikebana, as a general principle, accessories are not used. ♪

1 A flat-sided vase. Wedge two pieces of stick, crossed just below lip of the vase to support the main branch.

2 A bulbous-shaped vase. Split end of branch. Insert piece of twig across the split. As the branch leans forward, the crossbar will grip the top of the vase.

3 A curved-sided vase. Cut a stick of equal height to vase. Split one

end of branch and one end of stick. Place one split inside the other.



Arrangements by Norman Sparnon

A *nageire* arrangement of a lemon branch and two red roses in a brown vase.



A proposal for classification of wood in arrangements

DECORATIVE WOOD

Bob Thomas

A MORE LIBERAL APPROACH to the use and classification of wood in flower arrangements should be sought. We constantly rely on dried forms which have a woody texture as their basic substance for dominant use in most flower arrangements. Rather than being specific and saying driftwood, weathered wood, etc., I would like to suggest a more general classification, *decorative wood*, which would include the six classes listed below:

1. *Driftwood*—wood drifting in water and subsequently washed ashore; often figurative.
2. *Weathered Wood*—wood that has become discolored or worn by exposure to the weather.
3. *Dried Vines*—long tendrils or stems which are a natural growth characteristic of some plants.
4. *Bark*—the outside covering of trees and some plants.
5. *Seed Pods*—covering of trees and some plants which usually, when dried, splits and falls away to expose the seed. Names of these vary according to local specifics and actual botanical forms. For our purposes they may include shells, hulls, sheaths, spathes, roots and pods.
6. *Roots*—the part of a plant usually underground that anchors the plant and draws water from the soil.

There are probably other plant parts that would be listed in this classification, so may I suggest that any material that would 'fit' the listed definitions be included. There are many ways decorative wood can be used in a design.

As a Container—The wood must be stable enough to hold the other plant materials used in the design. Stability can be achieved by determining the nat-

ural balance of the wood. If the wood will not stand in the desired position, then remove that portion of the wood which creates the unstable problem. If this procedure does not work, then anchor the wood to a base or another piece of wood which will give the desired stability. The wood used for the container must not be top-heavy when standing alone because balance can seldom be achieved when the remaining plant material is added to the design.

Line Material—If you are competing in a flower show, the schedule will often govern the use of line material. When decorative wood is used as line, consideration should be given to what kind of line is needed. Thin, vinelike lines of decorative wood are more comfortable in a design when placed tall into space to carry the eye away from the base or weight of the design. Heavy, chunky pieces of wood should be placed low in the design, used as the container itself or as a dominant part of the focal area.

Accessory—The most natural thing most of us do is to take a piece of decorative wood, particularly the drift and weathered variety, and turn it about at different angles to discover unusual forms—a bird, a dog, a fish. All kinds of unusual aspects stand out. If this type of sculptural quality is the dominant feature of the wood, then use it as your accessory. Ask yourself these questions:

Does the accessory contribute to the overall design by giving visual balance and weight where it is needed?

Does the accessory continue or stop a line direction?

Does the accessory stress rhythmic movement by repetition of color, texture, dynamic force?

Adapted from *Guidelines*, the publication of the American Guild of Flower Arrangers.

Does the accessory help communicate the spirit or theme of the design?

Also, remember when using an accessory that the more traditional kind it may be, the more traditional the design will become. If we recognize forms such as animals or people, these are traditional. If the accessory contains the spirit of any of the above rather than the complicated forms, then it may be used in abstract design.

Forms Within Forms—There are two unusual ways of creating forms, within forms. First, by creating a contrived flower form. These forms have become a recognized part of today's design. Seed pods, hulls and spathes may be reshaped to create different and unusual effects. In so doing we increase the sensitivity involved with creativity.

Second, by the creation of a construction. This is a new word to the art of flower arranging, and it is being widely used today in our modern designs. It means literally just what it says, to construct or build. Constructions are free standing, three-dimensional, sculptured forms, consisting of one basic material. Man-made materials, such as metals, glass, plastic and wire may be used, or we may employ natural materials which would include decorative wood. It is a sculptured unit of abstract design that is permanently assembled and transported as one piece. Mechanics to hold this together include wiring, nailing, gluing and bolting.

Treatment of Surface

Whenever a desired color or texture is needed, we as artists must recognize this and use any method at hand to achieve what is desired. The textural surface should first be considered. If bark or decayed areas must be removed, a heavy wire brush can be used for this purpose. The surface quality can also be changed by brushing hard to create grooves or scratches in the wood. Other surface textures can be created by gluing coffee grounds or sand to the wood. The application of man-made products which change the color, texture or surface quality of any of the six flower show classes



Arrangements by Bob Thomas

Materials for this abstract design include decorative wood (driftwood), calla-lily, locust tree thorns and a black wooden base.

may be used at your discretion (if the schedule permits) but best only sparingly.

Spray paints are excellent for coloring decorative wood since a variety of blends can be achieved as well as shading when needed. A muted or shiny tone is created by using either a flat or glossy spray paint. However, any medium can be used to create desired effects—shoe polish, soil, bleach, gesso, etc. Never soak wood in pure bleach since it will destroy the surface. A solution of one part bleach to two parts water should be mixed, then brushed over the entire surface. Place the wood in bright sunlight until it is completely dry. Repeat this method several



An abstract construction of decorative wood (palm spathes), latinia palm seed pods and bird-of-paradise flowers.

times, allowing the wood to dry between applications, until the desired degree of whiteness is reached.

Substance and texture of any piece of decorative wood determine the type of mechanic used to anchor in containers or pinholders. If it is being used as a container, accessory or a dominant feature in the design, try to stand the wood so that the desired front is important to the design and where perfect balance will be achieved by placement. Many designers make a mistake by trying to anchor wood in a container when the container would look much better if placed behind, beside, or even inside the decorative wood. Remember all combined components (wood, container, flowers, foliage, etc.), when used, become a unit. Combined components create the whole, the whole being the design. There is no set rule, other than a written flower show schedule, that governs how we use decorative wood. Some mechanics:

1. *Pinholders*—A large holder should be employed whenever possible. Weight of holder should become more important than relying on a quantity of

posy clay to anchor the holder to a container. Never try to push a heavy piece of wood into a pinholder. In most cases the wood splits or becomes damaged beyond use. There are driftwood pinholders available for use which are screwed into the wood at point of contact and then inserted into the holder that has been anchored to the container. However, for the do-it-yourselfers, several small headless nails 2 inches in length can be driven into the wood in a clustered effect, creating the pinholder idea, and then stood in the anchored holder. Another point to remember is if any part of the wood is placed under water, that portion should be coated with a waterproofing substance. Wax, varnish or even plastic will prevent wood from becoming water-soaked and discolored.

2. *Hardware Cloth*—Cut a length of hardware cloth 3 inches tall with enough length to wrap around the wood at point of contact. After wrapping the wood, be sure there is at least one inch extending below the wood. Insert the wire into the pinholder. This will create an anchored collar in which the wood can stand.
3. *Japanese Method*—If a tall, vertical container is used, the Japanese method should be used. Hook a portion of the wood into the container, seeking balance by letting the wood encircle the container or by resting against the side. Sometimes, if the wood extends down, balance can be obtained by letting the wood rest on the base of the table under the container. Balance is important in placing wood in a container, not only visual balance, but actual balance. Wood is usually heavy and difficult to balance. If you have trouble balancing the wood, change the angle and placement until a comfortable position is found. If the wood is not properly anchored and keeps falling while you are working on the design you can be sure it will fall later while on display. ❀

CHRISTMAS DECORATIONS IN WILLIAMSBURG

Libbey Hodges

CHRISTMAS was a special holiday season in the 18th century. Many people want to celebrate it today in the simple manner the colonists did, with real greens, fruits and cones. Not only is it fun to decorate a modern home this way, but there are many old churches, homes and inns which could be beautifully enhanced by traditional plant materials and designs of the season.

In Colonial Williamsburg, the search continues for prints, diaries and letters which will give us clues about the Christmas customs that were brought from England and new ones that evolved. The period represented is 1699-1780—when Williamsburg was the capital of Virginia.

Decorations, dinner parties, the grand illumination of the town and bringing in the Yule Log were of great importance and pleasure to the colonists. The firing of guns seems to have signaled special events such as Christmas. The tutor of the Carter family of Nomini Hall, in Virginia, mentioned in his diary that he was awakened early Christmas morning by guns being fired all around the house. In the 1700s, presents were exchanged at New Year's, and Christmas was celebrated without Santa Claus or the tree. These traditions became popular in the 1800s.

Although we can read about the gala parties, there is little information about the decorations which were placed throughout the homes at Christmas. However, we know the plants that were native to America and we know from letters about many of the plants imported to grow in the new gardens. Since the colonists still had strong ties with England, it is likely that they would have continued to decorate in the simple ways they had across the ocean. Some of their favorite greens from home could have been sup-

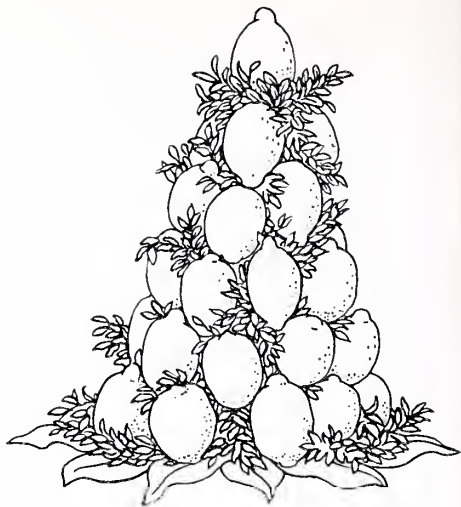
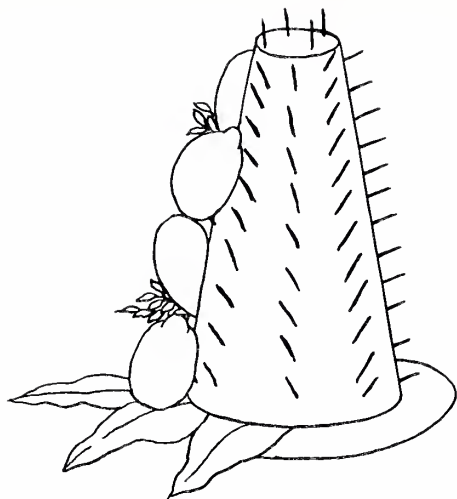
plemented by the southern magnolia and red-cedar which grow abundantly in eastern Virginia. By the 18th century, homes and gardens were well established in capitals such as Williamsburg and Philadelphia. Christmas would have been a time to entertain and decorate for company.

Fresh greens, such as hemlock, red-cedar, white pine, cherry-laurel and boxwood, have always been welcome at the time of year when no fresh flowers are available. They can be arranged in vases or used as wreaths to provide the natural decorations seen in Williamsburg.

Green arrangements might have been seen in a window seat, on a side table or decorating candle sconces, but not as a centerpiece for a dining table. An centerpiece filled with fruit and marzipan usually graced the table during the meal and provided dessert afterwards. Pyramids of fruit might have been appropriate. Precedent for the piling of cakes, cookies, sweet meats and fruit in pyramids comes from a print regarded as 17th-century Dutch. It is a drawing of a large banquet scene. On the tables are several pyramids of food on platters.

Fruit Cones and Ribbons

Pyramids or cones of fruit are the easiest and most dramatic way to decorate a dining table. Until one knows the secret of construction, it looks like a marvelous balancing act. Wooden cones of well-seasoned wood can be bought or made. Although dimensions vary, a standard size would be a 6-inch base tapering to a 2½-inch top with a height of 8½ inches. The top should be large enough to support a large apple or a small pincapple. Then drive in finishing nails at regular spacing on the cone. Plan on at least three nails to an apple and four nails on top of the cone.



Making a lemon tree.

Eva Melady

The wooden cone is easily handled and the table will be protected if the cone is placed on a pewter plate or a circular piece of cardboard cut about 10 inches in diameter. To cover this base, wedge large leaves such as southern magnolia or aucuba between the cone and plate. If the stem end is cut off of the leaf, it will lie flatter.

Now the fruit is ready to be added. If apples are used, they can be impaled in one side so they are upright. They can also be placed with the nails in their bases and their tops facing you. Large lemons are also easy to arrange on a cone. You will not be able to place the fruit close enough to hide the wooden base, so tuck small pieces of holly or boxwood between the fruit. This also softens the design.

Ribbon combined with fruit is a beautiful way to decorate a table without a cloth. In the 18th century ribbon was expensive and scarce—few persons, other than a governor or a milliner, would have had much. If ribbon is not used on a bare table, the same effect is possible by placing fruit, berries or greens on clear plastic as a protection to keep the oils and juices from staining your table. The ribbon and fruit can be laid in a pattern to designate individual place settings.

Small fruit which will not touch the table should be placed on top of the ribbon or plastic. These might be small oranges, 'Lady' or 'Yates' apples, lemons, limes and pears. Intersperse these with cranberries, cones and nuts. After arranging the fruit, use small leaves or small bundles of pine needles to fill in gaps and hide the plastic.

Mixed greens or an arrangement of a single type of evergreen might have been an appropriate winter bouquet in the colonial period. These could be arranged in a fan shape mass-type bouquet just as flowers would be at other seasons. During Christmas season an arrangement of greens would be a complement to any other decoration in the same room.

Berries usually reach their peak of color in Williamsburg in time for Christmas. Holly with its red fruit and bayberry with its blue-gray berries add color and dimension to a mass of greens. Dried seed pods always add interest. They might be okra, cotton bolls or pine cones. These green arrangements can be an experiment in texture. For instance, the fine needles of hemlock will stand out against the flat shiny leaves of southern magnolia. Such plant materials arranged in a pewter bowl would certainly welcome a visitor into the large, open hall-



Mantles are excellent locations for a grouping of greens. Water-soaked Oasis, wrapped in foil, can serve as a base. Here an arrangement of cones, lotus pods, limes and apples is complemented by magnolia and hemlock foliage. The portrait over the mantle is festooned with pine roping.

way typical of the colonial home.

Queen Mary II is known as England's first flower "arranger." She had none of the Oasis or pinholders which aid us today. Instead, to display her flowers, she encouraged the designing of the delft "bricks" with pierced tops. In the late 1700s, posy holders with "fingers" were made of English Staffordshire.

Wreaths and Swags

When the Christmas season starts in Williamsburg, decorations appear on doors, sign posts and railings. In the 18th century, Christmas meant a time of visiting relatives and friends. These were often month-long visits. Garlands and wreaths were a special way to welcome company.

Wreaths of boxwood, white pine or hemlock were probably used in Colonial Williamsburg. Boxwood usually lasts longer than other greens. These wreaths are trimmed with berries, fruits and pine

cones. The idea for the wreaths was inspired by Luca della Robbia, the 15th-century sculptor, who carved garlands of nuts and fruit in his terra cotta glazings. The fun of a della Robbia wreath is that it can be formal or informal.

In climates where winter is constantly cold but not freezing, fruit will hold up for seven to eight days before it needs replacing. Pliable wire such as an 18 weight should be stuck through an apple or lemon and then secured at the back of the wreath. A few twists with a pair of pliers are necessary before embedding the ends of the wire in the wreath. This prevents scratching your door. Large fruit such as pineapples and pomegranates should be cut in half and sprayed with a sealer before wiring. Birds may be among the visitors enticed by such decorations. To accent the fruit, holly berries or bayberries stripped of their foliage will bring out the fruit colors if massed beside them. Pine cones and sweetgum balls



Colonial Williamsburg photographs

The problem of putting one wreath on two doors is solved at Colonial Williamsburg by cutting the wreath in half! Apples, pine cones and boxwood form this holiday decoration on the double doors of a house in the Historic Area of Colonial Williamsburg.

are best attached to the wreath with florist picks. Wreaths such as these would probably have had no ribbon because it was expensive; also it was not needed because of the beauty of the materials.

Swags are easy to make and are a change from the usual round wreath. The long shape is made with two branches of red-cedar or a similar graceful evergreen. Shorter pieces are wired near the center; this forms a solid area upon which to attach an arrangement of cones and pods.

Roping and garlands are a perfect means for continuing the door decoration along a railing or onto posts without becoming gaudy. Pine is the best material to use in roping, either alone or mixed with other greens. Mountain-laurel has been used, but it is on the conservation list in many states. Roping is made of short pieces of greens with limber stems and a spool of 21 weight wire. Hold a bunch of two or three greens in your left hand, then wire them with the spool held in your right. Overlap the next

bunch on the stem of the first group and wire the two together. This will hide the stems and give strength to the roping. Continue to overlap, using bunches of greens, and wrap tightly. Do not cut the wire between overlaps.

Further Reading

- J. P. Dutton, *The Flower World of Williamsburg*.
 Louise B. Fisher, *An 18th Century Garland*.
 Tina Jeffrey, *Williamsburg Christmas Decorations*.
 T. B. Lewis and J. B. Young, *Christmas in Williamsburg*.
 Raymond L. Taylor, *Plants of Colonial Days*.

Source List

- Vases—from The Craft House, Williamsburg, Va. 23185.
 Fruit cones from The Williamsburg Lodge Gift Shop, Williamsburg, Va. 23185.

MAKE A LIVING IVY WREATH

Maude M. Philips

MY FIRST RECOLLECTION of wreaths is associated only with Christmas decorations. These were usually made of mixed greens, containing running-cedar and holly, decorated with berries, cones and/or bayberry, all natural materials sold at the street market. A red satin bow was added when used as a door decoration—a welcome greeting indeed! At the end of the Christmas season these wreaths were taken down and burned, along with the tree and other greenery, which by that time had become a fire hazard.

By the extravagant use of our native evergreens through the years, some species are threatened with extinction, thus making it necessary for restrictions to be imposed to make the public aware of this danger.

Each year seems to bring new and creative ideas for wreaths that do not call for the use of conservation material. One of these which I have enjoyed making for the past several years is the living ivy wreath. It should be started in late summer when August's shadows foretell the approach of autumn. This may seem a bit early if you are making these wreaths for Christmas but when you consider how slowly English ivy (*Hedera helix*) grows, August is not too soon to start. Experienced gardeners have observed that ivy seems to have three stages of growth: First it sleeps, then it creeps and then leaps into its naturally graceful development. I mention this so you will not become discouraged while waiting for your wreath to become established.

The material needed can be found at your local garden shop: A circular wire frame measuring 16 to 18 inches in

diameter; bag of stringy sphagnum moss—not the shredded or milled kind; dark green plastic strips about 3 or 4 inches wide; a few ivy pins (may be improvised by bending floral wire into a U-shape) to hold the plastic in place. (I tried using green waxed paper instead of plastic but the squirrels soon discovered it to be the ideal nesting material.)

Lots and lots of small-leaved ivy cuttings about 3 or 4 inches long will be needed to "plant" the wreath. (Avoid ivy varieties that have feeder roots along the stems—"Star" ivy, for instance, or the big-leaved types that are out of scale.) It is well to cut a goodly quantity of the ivy into desired lengths and keep in water until needed. Since the sphagnum moss must be soaked well before using, I strongly recommend construction of the wreath as an out-of-doors project, in a nice cool, shady spot, to be enjoyed with complete abandon.

Handfuls of the moss are squeezed to remove most of the water and then packed into the wreath frame deep enough for the ivy roots to develop. The plastic strip is then anchored with ivy pins and wrapped securely over the moss, being careful to overlap to prevent unnecessary leakage.

With a pencil, nut-pick or an old pen, holes are punched in the plastic and the ivy cuttings inserted deep enough to cover a node where roots will form. It is important to continue the design in one overlapping direction, using the longer and more graceful tips for the outer edge and the shorter ones on the inside of the circle, striving for a full, well-rounded effect.

When the wreath has been "planted,"

Adapted from *Old Dominion Gardener* (Vol. 15, No. 4), published by the Virginia Federation of Garden Clubs, and *The National Gardener* (Vol. 46, No. 6), the Bulletin of the National Council of State Garden Clubs.

it should be placed in a shady spot where it will take root and grow. Check it from time to time and turn the hose on it when needed. Do not overdo this for the sphagnum moss will absorb many times its weight in water. Trash-can lids make excellent trays for catching rain water when needed.

When the weather approaches frost and freezing, the wreath should be brought inside and given an occasional foliar feeding. If it grows too fast the ivy can be trimmed and new leaves will soon appear.

Warning: Because this wreath is necessarily damp, do not place it directly on furniture or walls. It is most effective in spring, summer or fall, when used on a glass-topped table or hung on a masonry

wall of a porch. When it is brought inside for fall and winter use, it should be placed on a tray or reflecting mirror to protect furniture. Its decoration may be simple or elaborate, suitable to the occasion. As a door decoration for the past several years at Christmas, I have used 'Lady' apples, fresh and lovely, with a simple red bow. For Thanksgiving, russet chrysanthemums, a bit of wheat and a gold or brown bow are attractive. For entertaining, what would be more effective than a punch bowl in the center of this living wreath on a large tray?

Whether it be for Christmas, birthdays or other festive occasions, may this wreath be a real joy and reward your labor of love! ❧



Arrangement by Maude M. Phillips

A living ivy wreath lasts all year and can be the base for added decorations suited to a special holiday. For Christmas, 'Lady' apples provide appropriate color touches.

CREATIVITY AND DESIGN

M. Benz

CREATIVITY is the expression of inspired thought, resulting in some type of form, such as poetry, painting or floral art. Creativity is that intellectual quality peculiar to man—his search for identity, personal freedom, satisfaction of accomplishment or fulfillment, resolved by his senses and reasoning. Man alone is endowed with these traits and talents which lead him into various fields of exploration, his avocation.

Science states the positive—factual, clinical, rational. Creativity, with intuition, is its opposite; it knows by a feeling, an inner voice and a compulsion to act. Every person has an innate appreciation of the beautiful. However, it is motivation, energy and experience which distinguishes the individual.

Creative thought may lie dormant for a long time, but at the right time design evolves. Experiences stored in the subconscious spring forth, causing action. The idea, and the desire to create, develops itself into recognizable form—design. Creativity is spontaneous and varies with the individual's experience. It may even be a hidden talent of which we are unaware.

Failures may come, but they are the building blocks for progress, the final product. Too often we envision the finished product as a tremendous undertaking and it causes us to rebel; however, by solving the problem step by step, we can accomplish the task.

The creative person holds on to his ideas and gives them play. He pays attention to vague feelings which are sometimes questioned by the pragmatic person and will have a deep, broad and flexible awareness of himself. He will refuse to be content with established habits of perception, and be willing to break with custom, the hypnotic spell of tradition. He will be dedicated to work, to explore; he will *not* be content with the already established idea. A creative person is



Recollections of Kona Beach in Hawaii are expressed in the black container and black foliage capped with the white foam of the agaves. They dash over the exotic flower (man-made of lily petals circling a round protea blossom). Any round flower can be the center of such a contrived flower.

emotional, somewhat psychic, and has a feeling that causes action. He is endowed with keen insight—knowledge without rational processes. He is more prone to venture into new, untested fields with a high degree of curiosity and with unconventionality of thought.

Creative art form may be considered an expression of man's spiritual being. It is a force that must find expression in some medium. It is more than a technical or mechanical skill with paints, clay, stone or plant materials. It is a natural inner force stemming from a basic desire for self-expression and freedom. Art (design) is emotion, imagination, vision where form takes shape. It is culminated through a medium in rhythmic harmony (order). As life is motion similar to a growing plant, so is art. It is motion and must progress. It is evolution in rhythmic form. Static form dies. Floral



Arrangements by M. Benz

Variegated aspidistra with sanseveria plants, pothos and Oriental candle. Aspidistra leaves turn tawny brown upon drying and last a long time. Sanseveria plants or cut foliage will grow in water for months.

art must move to unlimited horizons and integrate itself with the times to prevent stagnation.

History becomes real to us by the art of the past. The thinking, daily activity, and commerce are revealed by this art, thus giving identifying characteristics to each civilization. Every race is remembered by the art forms (designs) it produces and little else.

This sensitive appreciation for creativeness is best expressed by the Persian poet Muslih Saadi, a Mohammedan sheik who lived about the 13th century, in his quatrain concerning two loaves of bread:

"If of thy mortal goods thou art bereft
And from thy slender store two loaves
alone to thee are left
Sell one, and with the dole
Buy hyacinths to feed thy soul."

It is the feeding of the Soul (spiritual thinking) that illumines the imagination, creates and evolves functional form. This results in each civilization leaving its

visual record. The body needs food for sustenance. The mind must have visions, imagination, for creativeness.

The creative process embodies tension, striving between positive and negative. This is the Yang-yin of Chinese philosophy—intellect and intuition, the conscious and subconscious, conventional and unconventional, complexity and simplicity. It is a learning process by experimentation. It is willingness to venture forth without reasoning, but being forced by an inner urge to accomplish, to produce. It is a force that must be reckoned with, be satisfied, be fulfilled. And when accomplished, it moves off to new fields, finding new horizons, challenges, knowing that beyond there is more to be discovered.

Creativity is that never ending process exploring one's field to the fullest—knowing the end is never in sight, but step by step satisfaction is gained. It is progress. ❀

A daisy is a daisy is a . . .

WHAT'S A DAISY, MAISIE?

NEW ARRANGERS may stumble over the word "daisy." Actually there is no single plant for which this popular name is reserved, and botanists often prefer to use it in connection with an entire plant family, the Compositae, which includes among its 15-20,000 species such diverse kinds as the dandelion, thistle, blazing star, and what we gardeners think of as—the daisy.

Things aren't always what they seem to be in the plant world. What the floral arranger, in the case of the daisy, takes for a single flower on a stalk is in fact a large group of flowers. These flowers, arranged on a flattened head, mature from the outside toward the middle. They are of two sorts: the often showy ray flowers, spread out like a wheel and resembling petals; and the many tiny disk flowers clustered in the center, which collectively look much like a button.

Not all composites have the conspicuous ray flowers. (Some, e.g., artemisia, have no ray flowers at all.) Ones that do are frequently called "daisies" in horticultural parlance. Many of these make first-rate cut flowers as well as good garden plants.

The archetype to most Americans is the ox-eye daisy (*Chrysanthemum leucanthemum*), a Eurasian wild flower that has become naturalized practically all over the United States and is recognized by just about everyone as the field daisy. There's no need to grow it!

A related plant, the Shasta daisy (*C. x superbum*; formerly *C. maximum* of gardens), actually a hybrid group which was bred by Luther Burbank, produces a showier cut flower. There are over forty cultivars, including some very attractive doubles. The Shasta daisy varies in winter hardiness in the North and may be considered a short-term perennial unless divided every spring or two and given some winter cover.

After the other large white daisies have

come and gone, *Chrysanthemum nipponicum*, the so-called Nippon daisy, begins to flower. It is excellent for mid-autumn arrangements. The species, which is treated as a die-back shrub in winter, performs well in inland areas provided early, hard frosts don't injure the flowers. Its special value is in coastal regions.

Big white daisies have their place, and so do small ones. Keep in mind feverfew (*Chrysanthemum parthenium*), which is inappropriately called *Matricaria* in the seed catalogues. The flower head of this old-time favorite is less than an inch wide. The species itself is a short-lived perennial, but it reseeds freely and seldom disappears from the garden entirely. Unlike many daisies, feverfew will grow tolerably well in part shade. There are also "button" forms in white and yellow. Best treat these as annuals and consider it a bonus if the old plants come up in succeeding years.

Among florists, the marguerite (*Chrysanthemum frutescens*) is a classic daisy with either conspicuous white or lemon ray flowers depending on the variety. It becomes a sizeable shrub in very mild climates but is not winter hardy elsewhere. A marvelous pot plant—and fine for cutting because it's almost always in flower and the blossoms keep well.

Northern arrangers who are fond of yellow daisies that are perennial need not despair. There are leopard's-bane (*Doronicum caucasicum*), which flowers in spring, golden-marguerite (*Anthemis tinctoria*) and *Coreopsis lanceolata*—both summer bloomers, and certain garden chrysanthemums (*C. morifolium*) for autumn bouquets. *Heliothis* and *Helinium* round out the picture.

Daisies come in other colors, too. If pink, rose and crimson are desired in early summer arrangements, the painted daisy or pyrethrum (*Chrysanthemum coccineum*) and fleabane cultivars (*Eri-geron*) are easily grown perennials. For

late summer the native perennial asters we sent to England many years ago—and had returned in hybrid forms known as Michaelmas daisies—are available in many tints, including violet. Perennial gaillardias, from wine-red to yellow, although often short-lived in the garden, have a place in summer designs. Purple coneflowers (*Echinacea* hybrids), which are perennials varying in color, have curious disks that harden in time and become useful in dried arrangements. Best obtain named varieties to avoid the muddy mauves that afflict the wild sorts.

A good blue is rather uncommon in flowers, in daisies particularly, but Stokes'-aster (*Stokesia laevis*) is a perennial with several shades of it. The center looks more like a samoyed than a button. The China-aster (*Callistephus chinensis*), an annual, approaches blue in some varieties. Perhaps the most elegant blue daisy is a South African wild flower, *Felicia amelloides*, grown as an annual or greenhouse plant in the northern United States, as a perennial in the South and in

California. Blue is a word used with license by gardeners, but in the case of *Felicia* it is a true sky-blue. Selected color forms are available on the West Coast.

The term daisy is not very complicated then, if it is understood that a number of plants have a claim on the name—and we haven't even mentioned the beloved English daisy (*Bellis perennis*) (all right for cutting if you can find a long enough stem) and the large group called African daisies (exasperating because most close up in the dark or on cloudy days).

It would be nice to report on the appropriate instrument for severing the stem of the daisy "flower." *Webster's International* is of no help for it defines a 'daisy cutter' as: 1) "a horse that carries its feet low in trotting," 2) "a ball (as in cricket or baseball) so batted or bowled that it skims along the ground," and 3) "a fragmentation bomb." Well, let's try a sharp knife then or a quick snap of the stalk and enjoy some of the finest garden flowers there are for arrangements. 🌼

Eva Melady



The anatomy of a daisy. A typical daisy with both ray (outer "petals") and disk (center) flowers is at left. A dissected daisy is at right, with the disk flower shown at the lower right.

FLOWER SHOWS

Ruth Miller

THE FLOWER SHOW is the showcase for all gardeners, growers and arrangers alike. It fulfills a threefold purpose by stimulating an interest in the growing of plants, developing a sense of the aesthetic in nature and educating the community in new and recommended growing and arranging techniques.

Certain general practices and standards for flower shows have evolved over the years. (For a complete discussion see *Handbook for Flower Shows*, published by the National Council of State Garden Clubs, 4401 Magnolia Ave., St. Louis, Missouri 63110.) They include two equal display divisions (one for Horticulture and one for Artistic Design), a specifically written schedule, a seasonal or timely theme, educational exhibits, adequate staging and judging by qualified personnel.

The Schedule

The schedule for a flower show must be specifically worded. Requirements and restrictions for entering, staging, judging, and all rules are included. The schedule becomes the *Law of the Show* for staging, exhibiting and judging. A definite theme is inspiring to the exhibitor and appealing to the public and therefore should be evident throughout the entire show.

Since a flower show is educational, some "how-to" displays may add interest and variety. Many facets of plants, planting, growing and designing are available for such displays. For example: soil types or propagation of one plant—African-violets, herbs or indoor plants.

Good staging is consistent with schedule requirements as well as practical and beautiful. Aisles should be broad enough for easy traffic flow. The setting decoration should be unobtrusive. In a flower show, the plant material is the star.

Qualified judges contribute much pleas-

ure and harmony to the flower show. If a show is a specialized one, say, for chrysanthemums or orchids, then of course for the horticulture division the judging panels should include growers trained in the scoring of exhibition specimens of these types. Similarly in the Flower Arranging division, the judges should have broad knowledge of design principles and be trained in use of plant material.

The Exhibitor

The flower show exhibitor must have a comprehensive understanding of the schedule. The rules of entry, knowledge of the theme and the specific requirements of the class for which the entry is planned are necessary. The horticulture exhibitor prejudices the specimens available to be certain that they are worthy of exhibition.

The exhibitor in the Flower Arranging division recognizes that flower arrangement is the art of organizing selected materials "according to the principles of design to attain beauty, simplicity, expression and harmony" (*Handbook for Flower Shows*, page 90). Some research may be necessary to provide background for a knowledgeable entry. Many factors influence an entry in the Flower Arrangement division. A few to be considered are available background, lighting, transportation and life expectancy of the cut material. Beauty is the first requisite of the design entry.

All exhibitors accept with good grace the decisions of the judges. A flower show is fun. It is a competition and one entry wins—but all exhibitors should have a sense of accomplishment in beauty created and pleasure provided. In a well-balanced show there is appeal for all ages and all levels of interest whether in the area of growing, use or arrangement of plant material. ♣

BOOKS FOR FURTHER READING

Muriel Jaffe

Ascher, Amalie Adler. *The Complete Flower Arranger*. New York: Simon and Schuster. 1974.

Every facet is covered in this award-winning book, including the flower arranger's garden. There are step-by-step plans for basic arrangements, as well as traditional and modern designs that correlate with any decor, plus useful information for the person who would like to compete in shows.

Benz, M. *Flowers: Abstract Form*. Houston, Texas: San Jacinto Publishing Company. 1976.

Our imagination is sparked to create unique patterns in arrangements through the handling and designing of plant materials. These can be fresh or dried, left in their natural state, or strikingly altered. Implicit in the author's technique is that the materials guide the arranger. An elaborate volume.

Bode, Frances. *New Structures in Flower Arrangement*. Great Neck, New York: Hearthside Press. 1968.

Art forms of today are presented in an exciting manner through the medium of plant material. The arranger can learn to understand and create these provocative and eclectic new structures: assemblages, collages, constructions, mobiles, stables and stamobiles.

Goldson, Rae L. *New Trends in Flower Arrangement*. Great Neck, New York: Hearthside Press. 1966.

The author's distinctive arrangements reflect the changing world. Her understanding of design is presented with style and flair, as she creates boldly in this challenging art form.

Hirsch, Sylvia. *The Art of Table Setting and Flower Arrangement*. New York: Thomas Y. Crowell Co. 1967.

Both hostess and exhibitor are en-

couraged to draw upon many art forms. Simplicity, functionalism and unity of design are stressed. The author shows how to correlate table appointments with plant materials, and includes a selection of menus and table settings. Many distinctive photographs.

Nehrling, Arno and Irene. *Flower Growing for Flower Arrangement*. New York: Dover Publications. 1976. Paperback reprint.

An excellent guide for the gardener who is also an arranger. What, how, and when to plant for landscape effect is presented to achieve beauty, yet have cutting material available through the seasons. Instructions are given for pruning, forcing, conditioning and drying for best use in the home.

Sparron, Norman. *A Guide to Japanese Flower Arrangement*. New York: Hippocrene Books. 1974. (Available from Japan Publications Trading Co., 200 Clearbrook Rd., Elmsford, N. Y. 10523.)

A concise book intended to give the beginner and more advanced arranger a fundamental understanding of Ikebana. Basic designs are definitively described and illustrated for the moribana, nageire, shōka and rikka styles. After the basics are mastered, the student is encouraged to express himself by creating free style arrangements.

Sparron, Norman J. *Japanese Flower Arrangement Classical and Modern*. Rutland, Vermont: Charles E. Tuttle Co. 1962.

For the novice or veteran devotee of Ikebana, this work is inspirational. The history of Ikebana is well-documented, and there are detailed explanations of basic principles, "secrets," and symbolism. Arrangements in Ikenobo (the oldest school) and Sogetsu (one of the new-

est) are clearly presented and exquisitely illustrated.

Handbook for Flower Shows. Published by National Council of State Garden Clubs, 4401 Magnolia Avenue, St. Louis, Missouri 63110. Revised edition, 1970.

If you are planning a standard amateur flower show, this manual is essential. It gives complete information for planning, staging, system of awarding, judging and evaluating a show. Invaluable glossaries are included for both the Artistic and Horticultural Divisions. ❀

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Dorothy Biddle Service, DBS Building, Hawthorne, New York 10532. Catalogue 10¢.

Bonnie Manufacturing and Sales Company, Box 473, Lexington Park, Maryland 20653. Mainly for garden clubs and other groups. Minimum order \$50. Civic Garden Centre, Edwards Garden, 777 Lawrence Avenue East, Don Mills, Ontario, Canada.

Floral Art, P.O. Box 1985, Springfield, Massachusetts 01101. Catalogue 25¢. Flower Arrangers Workshop, P.O. Box

1331, Easton, Maryland 21601. Catalogue on request.

Royal Botanical Gardens, Floral Art Shop, P.O. Box 399, Postal Station "A", Hamilton, Ontario, Canada. Price list on request.

Note: Materials may be obtainable locally from certain florists. Also, keep in mind that less common supplies are often available from booths at flower shows. Some Japanese-specialty stores carry supplies for Ikebana. Most seed catalogues also list a few arranging items.

An arrangement of winged euonymus (*Euonymus alatus*), English ivy, daisies and green grapes.

Arrangement by Muriel Jaffe;
photograph by George E. Ernst



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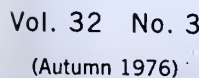
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BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

BONSAI FOR INDOORS

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*Indoor bonsai in training—
the on-going challenge.*



Arthur Orans

Beautiful structure for beginning bonsai. This Natal-plum (*Carissa grandiflora*) in upright style is 7 years old. It has been in training 3 years. Trunk will thicken with age.

Another Natal-plum, 6 years in training, 23 inches high. Left unpruned for photo, then pinched to shape top and branches.



Gregg R. Wadleigh

Front Cover: Singapore-holly, 24 years old, 19 in training. One of the oldest subtropical bonsai in the Brooklyn Botanic Garden collection.

LETTER FROM THE BROOKLYN BOTANIC GARDEN

Bonsai has had a special fascination for Americans in the last several decades, the interest having been spurred initially by GIs returning from Japan after the Second World War. What a mystery it was for a potential monarch of the forest to be grown indefinitely in a small container, an attractive miniature in all its parts. Hadn't we grown up to believe that bigger was always better? How could the tree live—and be a creation of art at the same time? The appearance of two Brooklyn Botanic Garden Handbooks, *Dwarfed Potted Trees* (1953) and *Bonsai: Special Techniques* (1966) helped unravel the mystery for many westerners.

In the early years of "American" bonsai—and even now, plants were lost for needless reasons. Because bonsai trees attracted the fancy (often passing) of a wider public, they were treated as inanimate art objects by some, not as living natural things that had to be nurtured daily. Failure resulted and mystery became enigma. But not to all. The pioneer short courses in bonsai conducted at the Garden in the 1950's by Dr. George Avery (now Director Emeritus) and Bonsai Man Frank Okamura were practical guides for those who wanted to get off on the right track. Such popular courses are still given and people often fly in from different parts of the country to participate.

There was another, more subtle reason for many people's lack of success with bonsai. Early practitioners on this side of the Pacific were often excellent students of the Japanese. This was fine so far as technique was concerned, not necessarily so fine as to the plants chosen. Bonsai in Japan evolved slowly over many centuries and the plants selected there were the best possible ones—for Japanese growing conditions and climate. The art did not have its origins in hot, dry, sometimes poorly lit apartments—the only condition that many Americans can provide for plants in the late twentieth century. The pines and other north-land trees so loved by the Japanese usually withered in western homes.

Americans were great copiers, but could they innovate? Was it possible to adapt bonsai techniques to plants that are better suited for indoors? A few people such as Constance Derderian, Ernesta Ballard, Sigmund Dreiling, Frank Okamura and the late George Hull began to quietly, sometimes casually, experiment with house plants. Indoor bonsai is still a new field and some traditional students may be displeased with any adaptation. There are no 100-year-old classics of indoor bonsai sculptured by time and succeeding generations of grand masters. Still, it makes uncommon sense to create new treasures with plants that will live and thrive in the home, where they can be appreciated year round.

Let us take a moment to thank Guest Editor Constance Derderian and her twenty Contributors for this pioneering effort. Mrs. Derderian, who took the first bonsai course B.B.G. ever offered, has become one of the country's leading proponents of subtropical bonsai, and her enthusiasm is contagious. Let this be a kind invitation to wander through these pages and discover a new dimension to an old art.

A final thought. People sometimes lament to Frank Okamura that they don't have enough patience for bonsai. Mr. Okamura quietly replies: "Patience is what you need when you don't like what you're doing." And that is one of the many spirits of bonsai.

Sincerely,

Frederick McGowaty, Jr.,

Editor

INTRODUCTION

Constance T. Derderian

THE INTEREST in house plants has grown to such a degree that now people who might never have tried indoor horticulture are becoming experts. For these people as well as the traditional bonsai enthusiast, indoor bonsai is a challenging new field to conquer. The pleasure of trying to grow different plants and the wonder of succeeding is ever new and possible for the person who seriously sets upon this pursuit.

Bonsai at first look may not be for everyone. For there is always someone who simply does not have the situation for growing anything in the home, let alone bonsai. Yet this person can create a

suitable environment, as might be provided by an artificial light unit. Each potential growing situation should be assessed for light, moisture and temperature, and adjustments made as necessary. The translation of information enabling one to adjust the situation has to be done by each person for himself because growing conditions in the home vary tremendously.

The literal translation of the word bonsai is to plant in a shallow pot. Over the centuries it has come to mean tree in a shallow container—a *very refined* version of a tree. Every tree in a shallow container, however, is not a bonsai. It is a

Gregg R. Wadleigh



Varied selection of mame bonsai aged 2 months to 4 years in training, arranged on 18 inch stand.

question of merit, with appropriate form attained by pruning, wiring and other techniques, and it is here that the novice becomes confused. With practice one learns whether a tree in a container is a good bonsai. The pursuit of this kind of knowledge can be one of the more exciting adventures in learning about plants.

Growing bonsai indoors is a relatively new field. Subtropical plants have been grown as house plants for years but not in the Japanese manner. More recently these subtropicals have been grown as outdoor bonsai in Florida and California, but only now are they coming into homes all over the country. The growers of tra-

ditional bonsai who have had to exchange houses for apartments, retirees who have moved from the North to the Sunbelt and house plant growers everywhere with increasingly refined tastes have created a need for information on growing bonsai indoors using subtropical plant materials.

We have asked people in several parts of the country to tell us how they grow their bonsai indoors and what they grow. Some are professionals, others are accomplished amateurs; all are innovators. Let them share their experiences with you so you can be off to a fine start in one of horticulture's most fascinating new ventures.

Living with plants

BONSAI IN THE HOUSE

Ernesta and Fred Ballard

For more than twenty years we have lived with plants. We share our bedroom with a 6-foot areca palm; our living room with a gardenia, two figs, another large palm and a number of smaller species; our hall with a 6-foot fig, a 5-foot schefflera, more palms, a podocarpus, a climbing fern, a tree fern, a Chinese-evergreen, an ancient aspidistra, and assorted others; our dining room with a medinilla, a weeping podocarpus, still another large palm, an araucaria tree, and again a miscellany of smaller plants, often changed to suit the season.

There are plants in the study, kitchen, cellar and offices. Many of them have lived with us for ten or fifteen years. So when we speak of indoor bonsai we mean bonsai living in spaces where people can live comfortably twenty-four hours a day. We exclude all special environments such as glass-roofed sunporches, recessed windows with interior glass and window greenhouses.

As far as horticultural literature is concerned, there is no such topic as indoor bonsai. Those who want to grow dwarf potted trees indoors year-round have to read standard bonsai texts for aesthetics and training techniques and indoor gardening texts for horticultural information and practice. Even after this preparation there is much trial and error, with the results dependent on the particular conditions in which the plants must live in the house.

Climate Differences

The reason why there is no comprehensive treatise on indoor bonsai is that the word "indoors" covers a vast range of conditions—from an unheated bungalow in southern Florida to a 70° apartment in Boston. At the southern end of this range it is possible to grow a tremendous variety of plants indoors. At the northern end the indoor conditions are tolerable for relatively few species. When friends tell you what

Fig. 1. Jade plant (*Crassula argentea*).



E.B. Gilchrist, Jr.

they grow in their houses, don't assume that you can do the same unless there are comparable conditions for the vital factors of plant growth—light, temperature (especially the low temperature at night) and atmospheric humidity.

When a bonsai fancier follows his natural instincts by collecting a specimen in the wild, putting it in a pot and bringing it into his house, he is, for practical purposes, moving it from one climate to another. The same is true when he buys a plant grown in a sunny greenhouse and settles it on his windowsill. Indeed, any plant indoors has been moved to an unnatural climate.

The effect that such a change in climate will have on a plant is roughly proportional to the difference between its native habitat and the artificial environment to which it has been transported. Since the climate indoors generally resembles the tropics and subtropics, at least as to temperature, plants from these regions will usually perform better in the house than natives of the northern temperate zone.

However, when it comes to predictions for individual species, there are no guidelines but experience. You cannot determine in advance whether the charming shrub seen growing in the Everglades can be acclimated to a New England dwelling, although it is a reasonably good bet that if the plant does not appear in any of the more complete texts on house plants, it has been tested and found wanting.

The reasons why some species survive moving into the house better than others are interesting. If you want to learn more about them, visit a good horticultural library and consult *Plant Geography Upon a Physiological Basis* by A. F. W. Schimper, published in 1903. It is still the best statement of why a five-needle pine or a trident maple from the cool-temperate areas of the world won't grow successfully on a windowsill. Dr. Schimper tells us that the life of a plant is made up of thousands of separate actions, each performed within its own range of temperatures, and that the critical temperatures for different functions differ by only a degree or so in "equable climates," but by many degrees in colder regions. This explains in a general way why tropical plants can be grown at uniformly high temperatures, while plants of the North, where there are sharp temperature differences between summer and winter and even between day and night, need alternate highs and lows, with the lows often below freezing. It also explains why the low temperature is critical in indoor gardening.

Plants to Grow

What does this mean in practice? For long-term success with bonsai in the house you cannot use the traditional favorites of the Japanese, such as the



E. B. Gilchrist, Jr.

Fig. 2. *Araucaria bidwillii*.

pinces, maples, spruces and beeches, that are native to the colder reaches. Choose a plant that will grow indoors, whether or not that plant appears in the Japanese bonsai texts. For example, one of the toughest of all house plants, capable of enduring high heat, low humidity and poor illumination, is the jade plant (*Crasula argentea*). For growing in the house, it can scarcely be beaten, but can you make a bonsai out of it?

The answer depends on your concept of bonsai. If all that will satisfy you are faithful reproductions of the plants displayed at bonsai exhibitions in Japan, you will not take kindly to a jade plant. But, on the other hand, if your idea of bonsai encompasses any woody plant trained to a decorative shape and planted in a complementary container, you may find that the jade plant has much to offer. Figure 1 shows what can be done with it.

Once you have accepted the notion of a jade plant, so manifestly a native of South Africa, planted in a container so man-

ifestly made in Japan, you are on your way to developing house plant bonsai. Other articles in this Handbook tell about particular species that have been used successfully, any of which might be suitable for your conditions. However, before we turn you over to our fellow contributors, there are a few more points that should be made:

Bonsai can be grown in more ornamental containers indoors than out. Figure 2 shows our Australian araucaria, *A. bidwillii*, in a blue and white porcelain pot from China. The free form shape, precarious balance, and fragile container would be out of place in a garden, but they make a striking decoration in the dining room.

It is often easier to treat tropical plants as large bonsai rather than small ones, because the leaves tend to be big and the internodal spaces long. The araucaria in figure 2 stands nearly 5 feet tall. We also have an American wonder lemon (*Citrus limon* 'Ponderosa') at least 6 feet in height and 4 feet across—too big for many houses, but very satisfactory if there is the space.

At the other end of the scale, we are just learning how to grow diminutive tropical bonsai under artificial illumination. For example, the normal distance from the base of the petiole to the end of the leaf in a schefflera (*Brassaia actinophylla*) grown indoors is about 30 inches. But we have one growing in a kitchen light unit for which the corresponding dimension is 3 inches, a tenfold reduction in scale. The trick is to grow the plant in a very small container no more than 6 inches below the lights, to pinch the growing tip frequently, and to cut off any leaf that exceeds the desired size. The same general treatment has succeeded with various ficus, pittosporum (*P. tobira*), finger-aralia (*Dizygotheca elegantissima*) and indoor-oak (*Nicodemia diversifolia*). We expect it will work with many other plants from mild climates.

One of the challenges of working with tropical material is to capture the feel of the trees in their native habitat, which is often quite different from the feel of temperate-zone dwellers. Figure 3 shows a huge ficus (note the man in the fore-

ground) with the surface root formation that many members of this genus have. There is also a strangler fig (*Ficus aurea*) in our collection displaying the beginning of a similar formation. The olive trees of the Mediterranean countries are another example of a distinctive habit of growth, and figure 4 shows a specimen of *Olea europaea* in which we have tried to capture this habit.

If you are set on reproducing traditional Japanese bonsai indoors, try junipers and cypresses: San Jose juniper (*Juniperus chinensis* 'San Jose') and Monterey and Arizona cypresses (*Cupressus macrocarpa*, *C. arizonica*) have done well for us. Also, if you can lower the night temperature below 65°, you may have success with pomegranates, such as the specimen shown in figure 5. From the warmer regions of Japan and other parts of Asia there are plants such as the

sago-palm (*Cycas revoluta*) and yew podocarpus (*P. macrophyllus*), which the Japanese grow as bonsai. These are adaptable indoors, too. Figure 6 shows an example of the former.

Since the growing conditions in the particular house are important, it may be helpful to note that in our own home the night temperatures in winter normally drop below 65°, sometimes as low as 62°. Except when the sun is on the plants, the day temperatures rarely exceed 68°. The house is noticeably cooler than most apartments, and consequently more humid, even though there is no humidifier. This enables us to grow the sometimes difficult gardenia (*G. jasminoides*). The coolness and humidity help prevent the premature dropping of flower buds, which is one of the common problems in growing this plant indoors. All the bonsai pictured in this article have

Fig. 3. Spotted fig (*Ficus virens*), of great size and age, photographed in China at the turn of the century by noted plant explorer E. H. Wilson.





E. B. Gilchrist, Jr.

Fig. 4. Olive (*Olea europaea*).

Vinciguerra



Fig. 5. Pomegranate (*Punica granatum*).



E. B. Gilchrist, Jr.

Fig. 6. Sago-palm
(*Cycas revoluta*).

spent at least one winter in our house. Most of them spend every winter there.

Adaptation of Bonsai

Some years ago the authors collaborated on a book called *The Art of Training Plants*.^{*} It described a wide variety of decorative plants and showed how all of them reflected to a considerable degree the philosophy and technique of bonsai. Our view today is essentially the same—bonsai principles should not be confined to the reproduction of classic styles, but should be used to create new forms in tune with contemporary American concepts of art. Particularly is this true indoors, where plants should be elegant and ornamental.

No one should undertake to shape trees

and woody plants, indoors or out, without a thorough grounding in traditional bonsai. However, we hope that readers of this Handbook will go further and produce American styles as typical of our culture as the conventional styles are typical of the Japanese way of living. The noted Japanese grower, Kyuzo Murata, in *PLANTS & GARDENS* (Vol. 31, No. 4), stated that the final goal of creating bonsai is to create a feeling of *Wabi* (a feeling of quiet, dignified simplicity associated with a place) or *Sabi* (a feeling of simplicity and quietness associated with something that is old and used over and over again). The feeling of *Wabi* or *Sabi*, he said, is something almost stoic which eventually leads to Zen Buddhism. We look forward to the day when American growers will find in their creations attributes that mean as much to us as *Wabi* and *Sabi* mean to Mr. Murata. This development may well begin with bonsai in the house.

^{*}*ed.*—now available as a soft cover edition in the Everyday Handbook Series, published by Barnes & Noble, a division of Harper & Row.

Signs of growth are apparent every day . . .

INDOOR BONSAI ARE DIFFERENT

Warren P. Cooper and Jerald P. Stowell

THE real secret of successful indoor bonsai is the proper selection of plant material—plants that take to the apartment environment. Good bonsai can be developed from semi-hardy trees and shrubs. Many woody tropicals, although they tend to look more herbaceous in young growth, are also fine choices. There is a wide range of possibilities, and each grower should want to select plants that will grow best in his home. For a list of potentially good indoor bonsai, see page 50.

Growth Rate and Pruning

Indoor bonsai, being largely tropical or semi-tropical, mature at least as fast as those from the temperate zones, and their appearance changes rapidly. Signs of growth are apparent every day, and the pleasurable treatments of pinching and pruning are frequently called for.

The techniques of pruning, root pruning and potting indoor bonsai are essentially the same as for spruces, pines, maples and other more traditional material. Growth takes place throughout the whole year, though it proceeds at a very much slower rate in autumn and early winter. A tropical tree gives the appearance of maturity in eight to ten years, whereas a tree or shrub from the temperate zone might require twice as long to attain the same venerable patina.

Pruning is important for any bonsai, but indoor trees tend to greater legginess and lose their shape more quickly than outdoor trees. Without constant attention to form, the intricate branching pattern that signals a beautiful bonsai will not develop. Trimming new growth is a continuing practice. Deciduous plants and broad-leaved evergreens have their new growth shortened. Conifers have their new shoots pinched back to leave only four or five clusters of needles at the base.

Watering and Fertilizing

Beware of the old wives' tale that bonsai are dwarfed by withholding water. The dwarf quality is due to pruning and container restriction. The trees should never be kept soggy, but neither should they be allowed to dry out completely, since this will cause damage to the root system.

Bonsai growers have different methods of watering. We feel that the trees should be watered thoroughly from the top, and the leaves should be frequently moistened. A florist's syringe is a good instrument to use in-between if each bonsai has been given a good watering. The spray, directed into the foliage, is especially beneficial to the plant in removing dust and normal city soot. One of the best places to water and syringe the plants is in the bathtub. Here you have no worry about watering tables, chairs and rugs along with the trees.

Proper fertilizing means good foliage color, well-formed flowers, an intricate branching system—in general a healthy, beautiful bonsai. The easiest complete fertilizer to use is one of the water-soluble products containing trace elements. These are made by several manufacturers and are available from any garden center. They should not be used full strength, however. It is best to dilute them by half. (See page 17 for more information.)

Indoor trees are fertilized during two seasons to keep them in good condition. A weak solution is applied once a week for three weeks in February to provide for forthcoming healthy growth. Too strong a solution when there is very little sun in winter will produce scraggly growth. However, if your indoor plant is one that goes dormant in the winter, it should not be fertilized until the new shoots appear in spring. Summer fertilizing is similar to outdoor care.

WHAT MAKES A GOOD BONSAI?

Mary P. Case

1. The container is of a style, shape and color to complement the style of the tree. Both are in harmony.

2. The surface roots, if any, make a gentle pattern radiating from the base of the trunk. No roots are crossed one over the other, nor are any exposed in an extreme or unnatural manner unless this is in keeping with the style of the tree.

3. The trunk is positioned in the container in an aesthetically satisfying spot for its particular style. Approximately the first (bottom) third of the trunk is clearly visible, and the second third is partially visible. The trunk tapers from the earth to the tip of the tree. There are no abrupt or artificial changes.

4. The main branches are gracefully arranged left, right and rear of the trunk. The distance between them is of equal or nearly equal proportion on all parts of the tree. None crosses another.

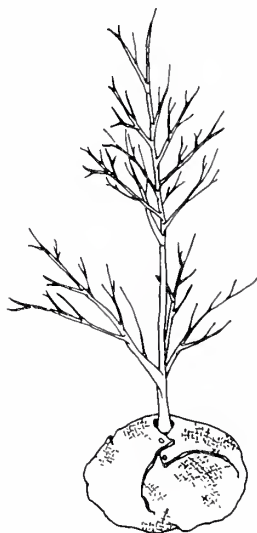
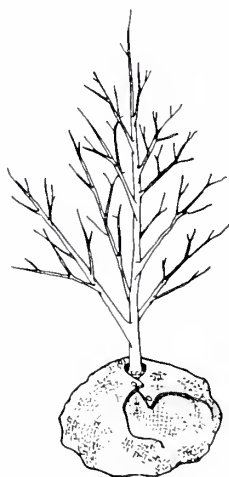
5. The twigs which grow from the branches make delicate and precise patterns, all of about the same length. If there are training wires, they are applied neatly to both branch and twig. The wires are of a dull color so they do not disturb the overall effect more than necessary. A 'finished' bonsai has no wires.

6. Leaves, flowers and fruits are all in good proportion for the size of the tree.

7. If the tree is grown partly for its ornamental fruits, they are arranged in a balanced fashion upon the branches. Should they be a little large, a number are removed to achieve a more natural presentation.

8. There is no evidence of stubs left from pruning or marks from wires, weights, or other props used in training.

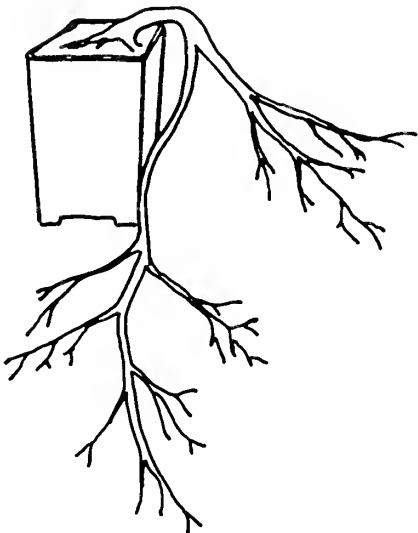
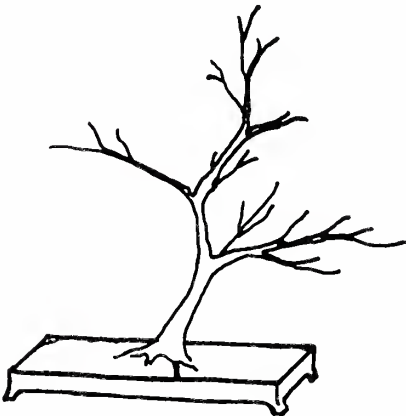
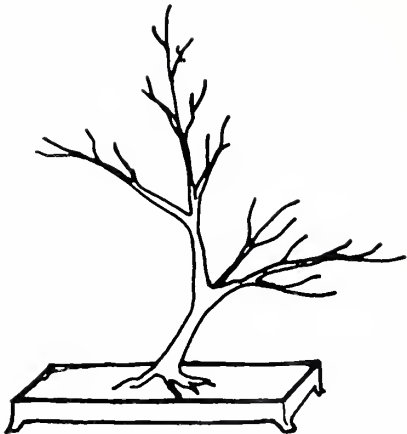
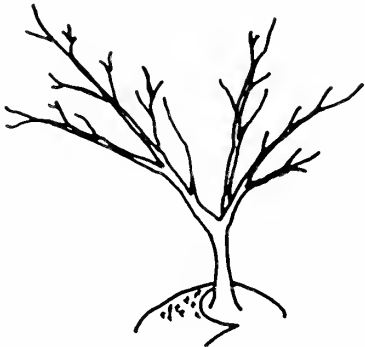
Adapted from *Tropical Bonsai*, American Bonsai Society, 1967.



Jeanne Derderian

Two trees from nursery. A shows more potential than B because of the more numerous, better spaced branches.

Preliminary pruning and possible subsequent training of tree A.



A BONSAI REFRESHER

Constance T. Derderian

THE JOY OF BONSAI is in the doing. To buy one is a short cut, but you will lose by this method. To really understand bonsai you must create one yourself. Read, look at examples—real or pictured, and if at all possible, take a few lessons.

Begin with a rugged, amateur-resistant plant such as the dwarf powder-puff (*Calandria emarginata*), Confederate-jasmine (*Trachelospermum jasminoides*), brush-cherry (*Syzygium paniculatum*; often sold as *Eugenia myrtifolia*), or a small-leaved ficus. One or more of these subtropical plants can be found in almost any house-plant nursery or florist shop.

Containers and Soils

Choose the container, keeping in mind the size of the plant and the bonsai style you wish to develop. (See page 29.) If an upright style is desired, almost any bonsai container of the low rectangular, oval, round or square shapes will do. Deeper containers are used for the semi-cascade or cascade styles. Do not worry about making a mistake for plants can always be repotted when you learn more. If you prefer, selecting a container can be left until after the bonsai has been shaped and styled in an ordinary clay or plastic pot. Bonsai containers may take a bit of hunting, but an increasing number of local garden centers, gift shops and even department stores are carrying them.

For the indoor gardener who does not have access to soil or compost, the mysteries of soil are best dealt with by using a commercial all-purpose potting mix and adding sand (approximately 1/6 to 1/3 by volume because such a mix already has some sand in it). An easy-to-find substitute for sand is bird gravel. Whatever is used, free draining soil is important.

If you prefer to learn to mix your own, start with the indoor gardener's basic 1/3 loam, 1/3 peat moss, 1/3 sand. Packaged loam is pasteurized, but loam from the garden is not. Good rule to remember: if you

dig it, cook it! This is done by baking the loam in a preheated oven at 200° F for half an hour.

After experimenting with the proportions, you will settle on the mix that is best for you. Regardless of the combination, it is best to put each component into a fine sieve to remove the fine powder particles and insure good drainage. The part that goes through the sieve is thrown away, and the part remaining *above* is used. Bonsai soil is used dry so that it will move down through the roots easily when potting up.

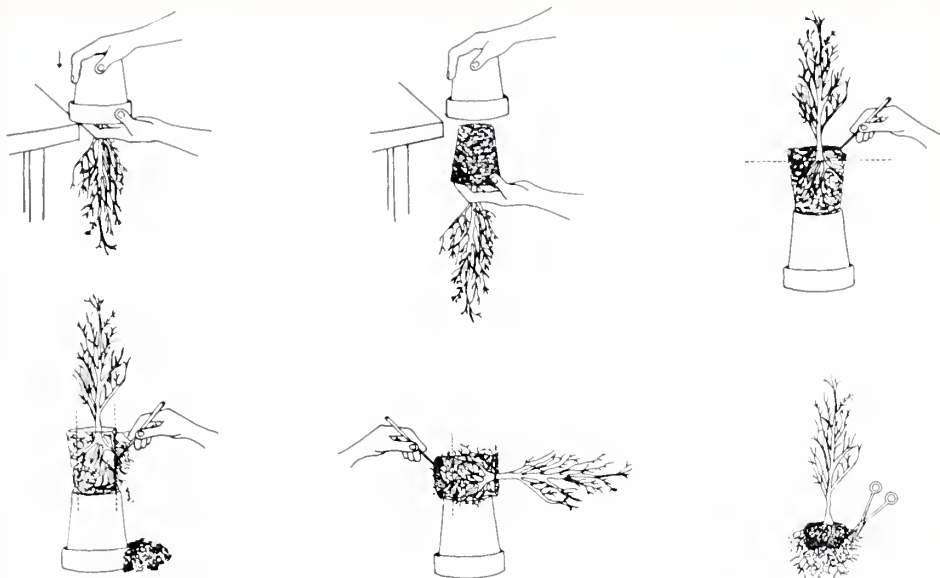
Tools and Pruning

The tools needed for bonsai are few: sharp scissors, good pruning shears, a wire cutter and one unusual implement for westerners—a chopstick (even a knitting needle will do). There are excellent tools made especially for the bonsai grower. They make the work neater as well as easier but can be acquired as your interest and knowledge grow.

Start shaping the tree in the chosen style by removing unnecessary branches and shortening the remaining ones if needed. Wiring, if any is necessary, should be applied at this time—doing it after the plant is in the container wiggles the tree and can damage the roots that are left. For a discussion of wiring see page 19. When the general shape is achieved, the plant is ready for potting up. The fine pruning, pinching and adjusting of the branches, is done after the plant is in the container.

Potting and Placement

When the preliminary shaping is done, take the plant, (whose soil should be on the dry side for this operation) and with a chopstick reduce the root ball by removing soil and cutting away the exposed roots. Don't disturb the soil immediately around and below the trunk.



Jeanne Derderian

Remove plant from pot; using chopstick or similar tool, tease soil away from roots, leaving a central ball of soil; trim roots—especially older, woody ones—leaving young and fibrous roots in center; repot.

With the vigorous subtropical material used for indoor bonsai, up to two-thirds of the roots can be cut away. A beginner should err on the side of safety and do less rather than more. At this point, the plant is ready to be put into the container.

If the first container is too large, don't worry about it because the plant will grow well even if it is out of scale. Later, when potting techniques become familiar, the bonsai can be potted down—that is, put into a smaller container. Placement in the container should be slightly off center and slightly to the rear of the intended viewing side. Sometimes a heavy root will not allow correct placement. Do the best you can and cut the heavy root back at the next potting.

For subtropicals, repotting depends on the growth of the plant. Some grow very slowly in a small container and do not need a yearly root pruning. When in doubt, however, do it once a year in the spring. After potting, the bonsai is set in a basin with water up to the rim of the container until the soil is saturated. It will not

need water again for a day or two. From then on I always water from the top.

A Ground Cover

Cover the surface of the soil so that it will not wash away. Moss, fine pebbles and finely ground bark are favored ground covers. Baby's-tears (*Helxine*) and other tiny-leaved creepers can be used if the container is large enough so that the creeper does not deplete the soil of nutrients or destroy the proportions.

Moss is the best cover for any bonsai. Experiment with different kinds growing in your area. If you are an apartment dweller, obtain some from a greenhouse, where it is often found growing freely on the benches. Although moss thrives under moist conditions, some bonsai plants grow best on the dry side. Misting the moss surface lightly and frequently is the solution.



Subtropical materials often have an innate grace that is well suited to decorative containers.

Gregg R. Wadleigh

Watering and Fertilizing

It may take five years to learn how to water some bonsai precisely, but don't let this discourage you. Avoid extremes. Never let the plant dry out completely, but don't keep it constantly wet, either. Watering once a day is usually enough, depending on the light and the temperature. If a certain plant needs to be grown on the dry side, a small amount of water daily or a liberal watering every other day is a technique to use. Try each way to see which is best for the plant. Occasionally a bonsai can be watered by soaking it in a basin of water, but I do not recommend doing this regularly.

Because bonsai soil is free draining and frequently watered, the nutrients are rather quickly drained out. Fertilizing regularly will help to keep the bonsai healthy, and a small amount of soluble fertilizer weekly is better than a large dose monthly. The new grower should probably begin with a soluble 5-10-5, a balanced fertilizer having twice as much

Nursery stock of dwarf powder-puff (*Calliandra emarginata*) temporarily overpotted to allow maximum growth to thicken trunk and branches.

Peter Chvany



phosphorus ("10") as nitrogen (the first "5") and potassium (the second "5"). Avoid fertilizers with a high proportion of nitrogen because growth will be too lush and will defeat the bonsai purpose.

Whatever soluble fertilizer is chosen, use it at half the strength recommended on the package and then dilute it even further if it is to be used more frequently than specified in the directions.

Example:

Directions say 1 tsp. to a quart of water, once every two weeks.

For bonsai use—1/2 tsp. to a quart of water, once every two weeks or—1/4 tsp. to a quart of water, once a week or ten days.

Pests

Sooner or later one learns about the common plant pests such as mealy bug, scale, white fly, and, worst of all, spider mites. To help prevent them, keep the plant healthy and the air circulating. Wash the foliage, including the underside, with the sink spray about once a week. Learn to recognize the pests for they can then be dealt with before doing too much harm. A simple

method is to dunk the entire plant in lukewarm, soapy (not detergent) water and then rinse, or brush the affected areas with rubbing alcohol and finish with a clean water rinse. Out of necessity I have brushed the entire plant with alcohol with no adverse effects. If more than this is needed, use an appropriate house-plant insecticide. Take special precautions because any spraying in the home, even with a carefully aimed aerosol, has its risks.

Use a large box or plastic bag to contain the plant and restrict the spray or, using rubber gloves, brush a dilute solution of insecticide over the plant. Regardless of method, protect the soil with plastic from any drippings.

"The longest journey begins with a single step," is a quote from the Chinese. Bonsai is an exacting art with living plants and you may be discouraged at times. However, take the first step. If your initial bonsai does not survive (and it may very well not) apply what you have learned to the second. Read a bit more or take another lesson. Soon there will be more success than failure and then your journey is confidently under way.

Stacy Holmes



Interior of window greenhouse, ideal for maximum sun with winter protection for indoor bonsai.

WIRING

Constance T. Derderian

SOMETIMES it is possible to shape a bonsai exclusively by pruning and trimming, but in many cases wiring is necessary to change the angle or direction of a trunk, branch or twig. Major wiring is best and most easily done just before the plant is potted up. Minor wiring can be done at other times, preferably when the plant is actively growing, but care should be taken not to disturb the roots in the container while doing it.

Use copper wire because this type holds its position best. It is available from hardware stores in different gauges, nos. 10 to 22 being most appropriate. The gauge of the wire depends on the diameter of the trunk or limb to be treated. Occasionally a heavier-than-usual wire is necessary because a particular branch is very resilient; use two smaller wires if you do not have one heavy enough. Sometimes it is wise to wrap the wire with florist tape to protect the bark.

Whatever is done, take care not to wind the wood too tightly or the pressure will scar the bark. The duration of wiring depends on the vigor of growth at the time. Overall growth rate of the particular species and size of the branch are also factors. Sometimes three to six weeks are enough for indoor bonsai, occasionally a longer time is needed.

Subtropical plants are in general much

faster growing than ones from the temperate parts of the world, so frequent inspection of the wire is wise. It is not uncommon for branches to be wired a second time. Make sure to unwind the first set of wires with care. Rewiring, if necessary, is done immediately.

Here is how different parts of the tree are treated:

Trunk—begin at the base by inserting the wire at least 1 1/2 inches to 2 inches into the soil and coil upward spacing evenly.

Avoid passing the wire too closely to where the branches meet the trunk.

Branches—begin by anchoring wire firmly by passing it at least one full spiral around the trunk or, if two branches are to be wired, use one piece of wire winding the middle portion around the trunk between the two branches and continuing on out toward the end of the branch.

Twigs—begin by securing wire by spiraling it twice around the branch so it won't wobble when bending the twig.

If the coil is too far apart it will not hold its position. If it is too close together, it will injure the bark in the bending and look ugly.

When branch wire is added where there is already trunk wire, the branch wire should closely parallel the larger wire so it is neat and doesn't disturb the eye. The same applies to twig wires.

WIRING TECHNIQUES

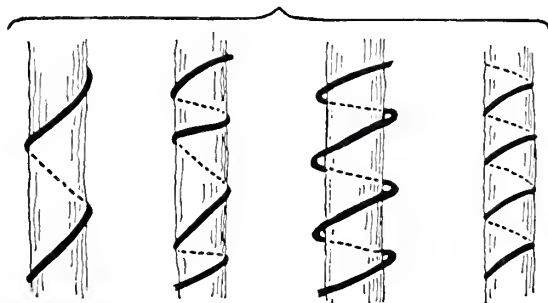
"Never be in a hurry. . . . It is the hands which must do the learning, slowly and repeatedly until they can think for you."—Yashiroda

THIS



Correct wiring

NOT THESE



Spaced too widely—won't hold position

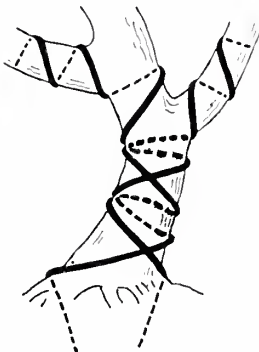
Uneven—won't hold position

Too loose—won't hold position

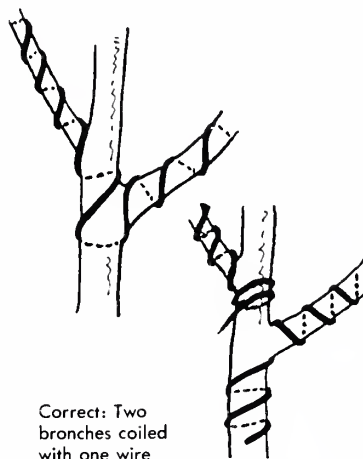
Too tight—scors form quickly



Correct: Parallel wires wound close together



Wrong: Crossed wires have little holding power



Correct: Two branches coiled with one wire

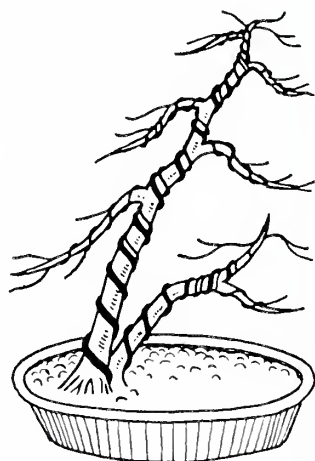
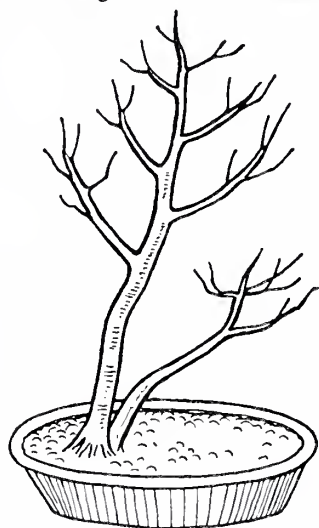
Wrong: Won't hold as well, and tree looks over-wired

Begin wiring at bottom of tree and work upward. If trunk is to be wired, anchor wire ends by pushing down through root ball to a bottom corner of container. Avoid sheathing a tree in wire; good wiring practices give best results with least wiring.

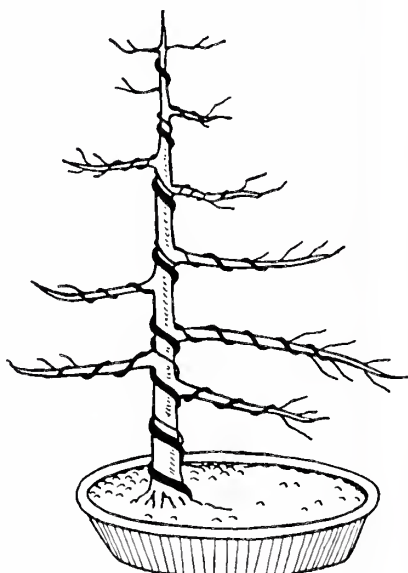
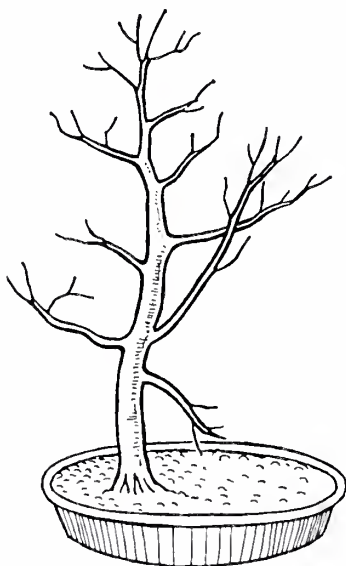
All drawings adapted from Toshio Kawamoto and Joseph Y. Kurihara, Bonsai-Saiki.

SHAPING A TREE WITH WIRE

"Wiring has two purposes: to help the tree attain its ideal form, and to correct overlapping branches so that all can receive the sun and evening dew."—Saburo Kato



Branches growing upward can be trained to slope downward or outward, suggesting the form of an aged tree.

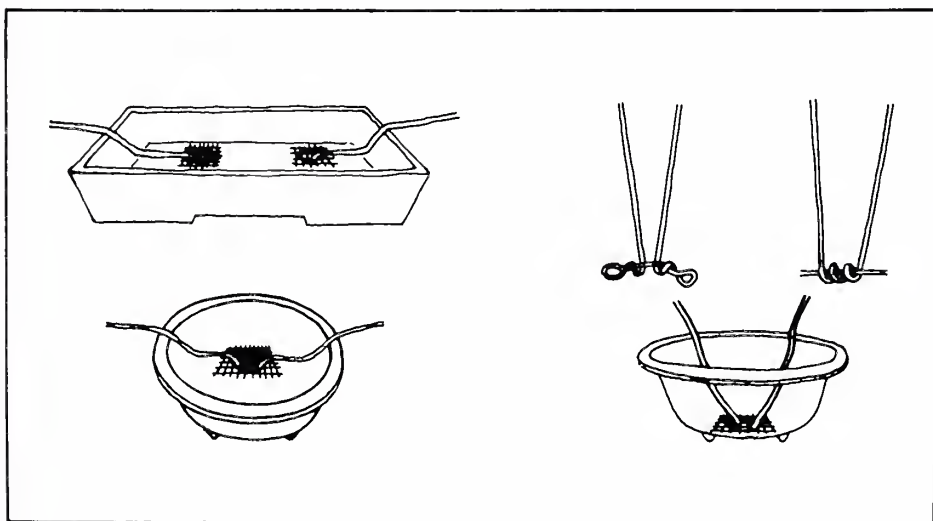


Wind wire clockwise for training a branch to the right, counterclockwise for training it to the left. Wire should be of a size just stiff enough to hold newly bent branch in position.

Drawings adapted from Toshio Kawamoto and Joseph Y. Kurihara, Bonsai-Sakei.

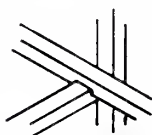
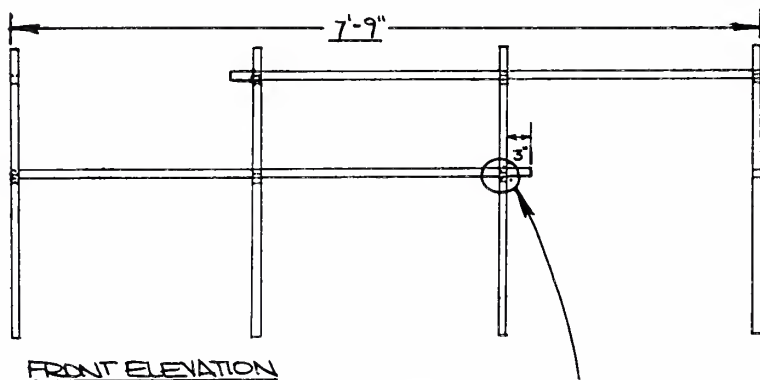
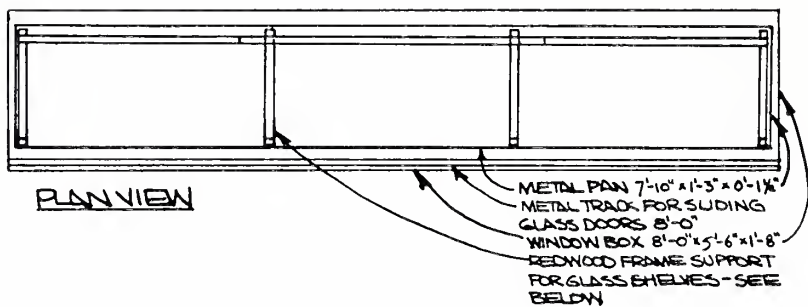
Preparation of Container

Hardware cloth or plastic screen is used to cover drainage holes. Gravel is then spread on the bottom of the pot for drainage. (The larger the pot, the larger the size of gravel you should use.) If the plant is big or tap heavy and needs support while the roots get established, copper wire is inserted through the bottom of the container before potting, the plant is inserted, and the ends of the wire are bent up and around the root ball. (See diagram for anchoring wire if the pot has only one hole.) For added security for tap-heavy plants anchor the wire and bring the free end up through the root ball. Use this to wire the plant trunk and branches. The ends of the wire are hidden by the top of the soil mix. Remove the wire after the plant has rooted well.—*Edmond O. Moulin.*

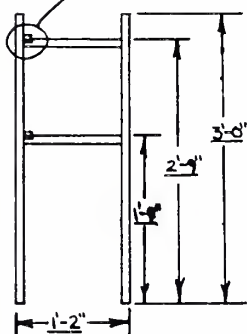


Jeanne Derderian

If the pot has only one drainage hole, twist wire like a candy wrapper or wrap it around a finishing nail so it will straddle the hole and be anchored to the underside of the pot.



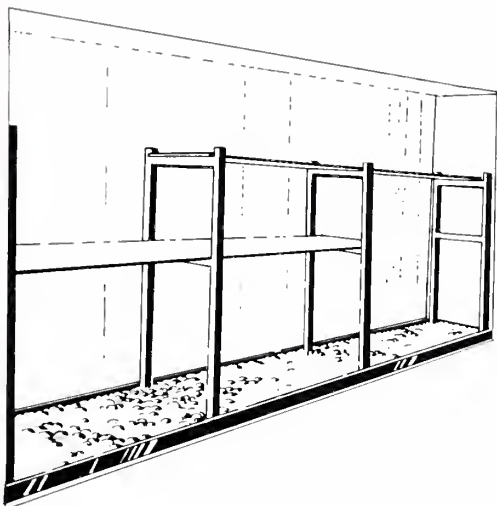
STIFFENER DETAIL



By IVY MITCHELL

A Window Case For Bonsai

A recessed window becomes an indoor bonsai display and growing area. These shelves, or a similar design, can be adopted to other types of windows, sliding glass doors or floor-to-ceiling glass panels.



Left: Schematic drawing of finished shelf.

Below: Glass shelves in red-wood frame for bonsai culture are removable for window cleaning. Installation of sliding glass panels adapts window for temperate zone bonsai that need winter chilling treatment

Drawings by Ivy Mitchell



Hutchins Photography

*If you can grow house plants,
you can grow indoor bonsai*

CARE—PRELIMINARY REQUIREMENTS

Edmond O. Moulin

INDOOR PLANTS for bonsai? Why not? It makes excellent sense to experiment with them. By adapting the traditional pruning and potting techniques practiced by the Japanese it is possible to bring a refreshing innovation to much material previously untried as bonsai.

Light

Let's talk about some of the preliminary and necessary requirements for growing indoor bonsai successfully. All plants require light and bonsai are no exception. Those with flowers and fruits often need more light than most. Plants grown indoors never receive quite as much light as their counterparts outdoors, so their placement within the home becomes all the more important. If at all possible, choose an unobstructed east, west or south window. The last site is best in winter, especially for plants with the greatest light requirements.

There is no need to despair if your natural light indoors is less than adequate. A wide variety of modestly priced units are now available, as well as automatic timers. Vita-Lite, Agro-lite or the cool white fluorescent tubes combined with incandescent bulbs may be used on indoor bonsai with excellent results. The practice is to provide artificial light for about sixteen hours a day at a distance of 4 to 12 inches above the plant material. More light can be provided by vertical banks of fluorescent lamps.

Temperature and Humidity

Temperature is another important cultural factor to consider. Most people are comfortable with a house temperature of a constant 68°—72° F day and night. Plants generally perform better if the temperature at night is ten or fifteen degrees

cooler than in the day. Fortunately, however, both people and plants are moderately adaptable creatures. First, consider lowering the thermostat a few degrees at night. It's a good conservation practice these days anyway, heating bills will be less, and the plants will grow better.

Another point to remember is that even our modern, centrally heated homes have microclimates of sorts, and these may be put to work for indoor bonsai. Thermostats are usually set at eye level, but the temperature near the floor is lower. In a well-ventilated house the temperature can vary as much as ten degrees for every 3 feet of height. An additional way of providing a cooler location for indoor bonsai is to place them between the window and a pair of heavy drapes. At night when the drapes are closed, the lower temperature will benefit the plants.

The worst enemy of indoor bonsai is dryness, for our contemporary abodes are as arid as the Sahara. The higher the temperature is, the lower the relative amount of moisture in the air will be. There are various corrective measures to be sure, including installation of a humidifier, revival of the Victorian technique of grouping plants, misting of foliage (though this has but brief benefit) and the placement of pots on moist gravel. Some innovative gardeners have even experimented with growing indoor bonsai in modified terrariums, enclosed but away from the direct rays of the sun.

In Summer

All plants benefit from being outside during the summer if space is available in areas protected from winds. Plants can safely be placed outside after the last predicted frost date for your area and, better yet, when the night temperature does not fall below 55° F.

David Fukumoto



Bark and roots of cajuput-tree (*Melaleuca quinquenervia*) develop character with age.

an open window having good light. There should be no strong drafts of either heated or cooled air. Rotate plants every other day—as should be done during any season of year. If the only window is on the south side of the building, keep the plants back several feet for a couple of weeks to prevent burning by the hot sun. Gradually the plants can be moved closer to the window but never put on the windowsill because of the danger of a pot falling. Plan to syringe the foliage even more than in winter because of soot and dust.

Do not be dissuaded from growing indoor bonsai because a few extra steps are involved in their care. This is an exciting new way of growing plants and you can put your imagination to work in a beautifully creative fashion. Remember, if you can grow house plants, you can grow indoor bonsai.

As with all plants grown indoors, bonsai should not be set immediately in full sun outdoors. Gradually acclimate the plant by moving it from a shadier location outdoors to filtered sun and then to full sun (for those species which benefit from full sun). The two-to-three week period of acclimation allows the cutin (wax layer) of the leaves to develop in the presence of the ultra-violet rays of the sun.

Of course, watering during the summer will be much more frequent and a critical factor to regard. Plants should be moved indoors in late summer or early autumn *before* the night temperature drops below 55° F. The plant should have at least a few weeks of adjustment before the heat is turned on. The usual practice of retrieving a plant on the night a frost is predicted and then plunking it in the heated home often causes problems and frequently results in the death of the plant.

If you live in a high-rise apartment with no balcony or fire escape for bonsai summer vacations, try to place the plants near

Peter Chvany



Jaboticaba (*Myrciaria cauliflora*) has handsome, multicolor exfoliating bark.

PRUNING CAN MAKE THE DIFFERENCE

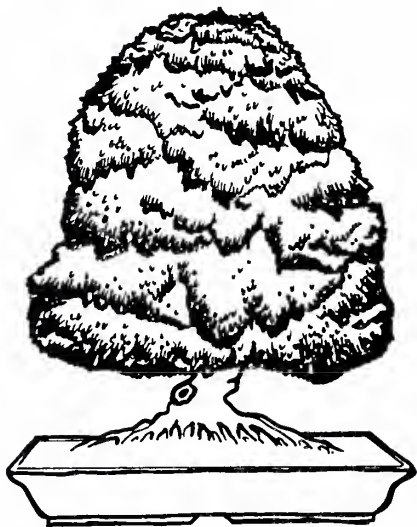
John Yoshio Naka

TO GROW an indoor bonsai takes skill and care beyond selecting a suitable plant. The reasons why the more traditional bonsai plants die after being kept indoors for any length of time is that lacking are such natural elements as necessary light, air circulation, humidity and, of course, rain and dew.

However, once a suitable plant has been selected that will thrive under most indoor conditions, satisfactory results can be achieved, especially with pruning and

trimming. If not properly pruned, the tree will lose compactness, which is very important for a bonsai. Keeping it too bushy will cause it to lose its leaves and some of the small center branches. If the tree becomes too weakened, it will be more susceptible to diseases and insects. More care and caution are needed to maintain an indoor bonsai in a healthy condition.

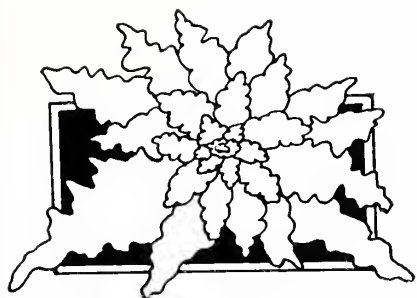
The following are guidelines on pruning and trimming to shape a bonsai and keep it healthy indoors.



Prune and trim to expose the trunk and branches. Indicate a definite apex and create a triangular outline of the tree. This will keep the inside branches healthy and compact.

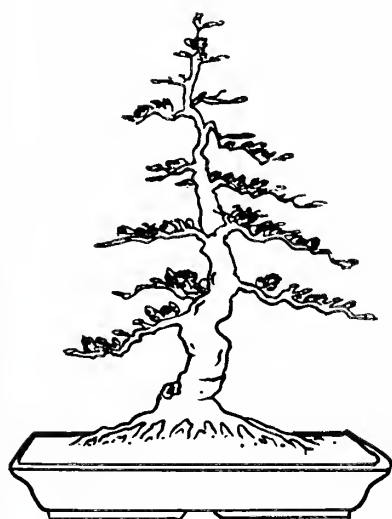
This bonsai has reached a very bushy stage and none of the details such as the trunk, branches or a definite apex can be seen. Eventually the center of the tree will die out.



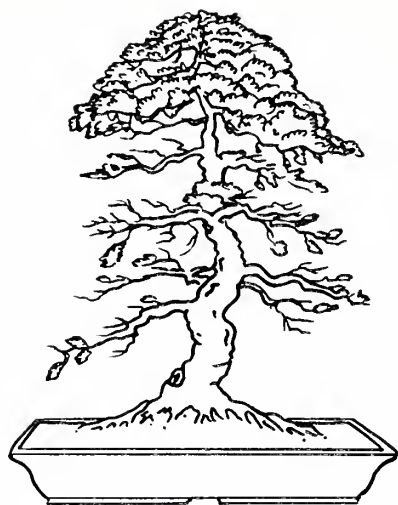


Prune all excess branches so they do not overlap any other branches when viewed from the top. Each branch should be placed in a different direction so it will receive light. This arrangement will also give the bonsai depth.

All sides of tree must be rotated to receive either the sunlight or artificial light. If kept in one position too long, the side receiving the light will get bushy and the opposite side will become weak and straggly.

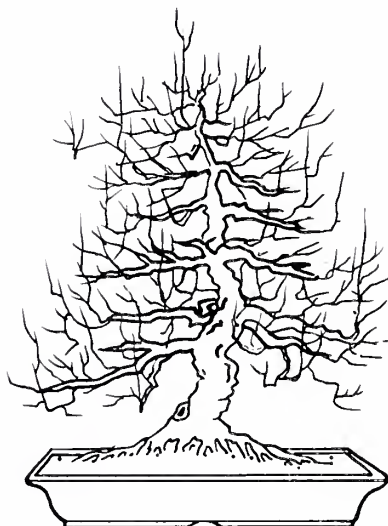
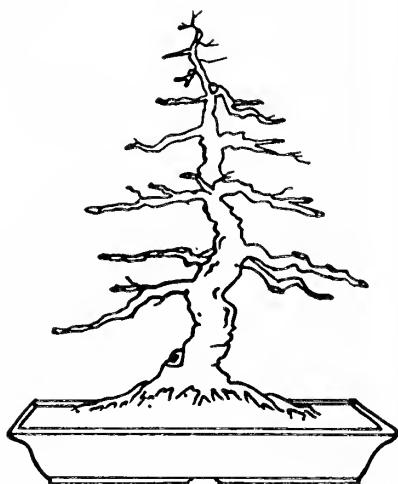


If the plant is lopsided due to uneven light, the stronger side must be drastically pruned back to the same structure as the weaker side. The weaker side should be pruned, too, especially all the dead branches. Be sure to rotate the plant evenly after this.



Without regular pruning the tree will become top heavy, causing the interior branches to die back and, due to leggy growth, it will assume a bulky appearance.

The heavy top should be cut back drastically by removing the long and large branches, and leaving only the small and short ones. Prune back to original apex. Treat any large scars with sealing compound. The lowest branch should be the longest and the largest in diameter. Trim the small branches and cut back any dead ones.



Leave all fresh growth alone until the tree establishes strength.

Then shape it by trimming and wiring. If there is plenty of growth growing sideways, then any growth pointing downwards or upwards should be removed. If not they should all be wired and trained to go sideways to form a flat plane.



Strive for a natural form

BONSAI STYLES

Constance T. Derderian

THE REQUIREMENTS for good bonsai material common to all styles are a nicely tapering trunk, evenly spaced branches diminishing in thickness of limb from base to apex, compact growth and small leaves. Some kinds of plants can be used in more than one style. As with traditional bonsai, strive for a natural form. A good bonsai is one which imparts the feeling of nature in miniature.

The style of the bonsai is dependent upon the structure of the plant material. *Formal upright*, with its precise requirements, is perhaps the most difficult to achieve and maintain with subtropical plants and, to my way of thinking, not worth the effort required. *Informal upright* style is by far the outstanding form for indoor bonsai because the grower can work easily within its limits. A slightly curving trunk and three or more branches ("... one to the left, one to the right and one to the rear for depth") is easily found.

Slanting style is another favorite, espe-

cially of the novice, because he associates its look with bonsai. A leaning trunk and two lower branches are needed; sometimes only one will do, depth being provided by width in the lower branch and/or the shape of the top of the tree. *Semi-cascade* is an exaggerated slanting style. It may or may not have branches low on the trunk. The apex of the tree is on a level with, or slightly below, the rim of the container.

An unkind phrase which has grown out of bonsai study is, "When you don't know what to do with it—make a *cascade*." For the beginner it signifies an easy style; it isn't. A good cascade is a simple but deceiving form. It can have any number of branches, left, right and front (none to the back) and the apex of the tree extends beyond the bottom of the container. The one thing to avoid in a cascade is an upright trunk with an abrupt curve downward. The trunk should slant or be almost flat as it grows out of the container.

ILLUSTRATED GUIDE TO STYLES

Frank Okamura



Informal upright (Moyogi) style with Shari branch (dry part within foliage).



Clinging upright style with driftwood or stone. Imagine a tree holding onto a rock in a gorge.

Slanting style with gnarled Shari trunk (aged dead wood).

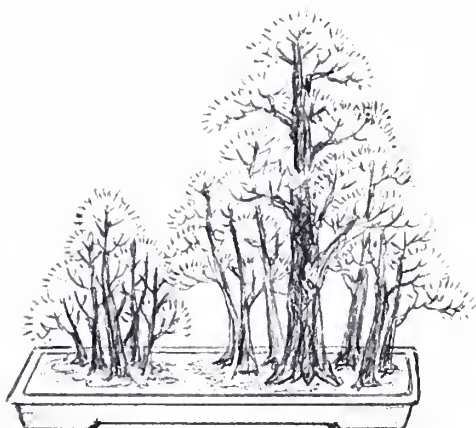
Slanting style with Jin.





Forest style. Illusion of distance by sloping. Suggestion of mountains.

Two-group style. Suggestion of two human families.



Group slanting style.

Tornado Shari trunk with Jin, upright style. In Jin, exposed dead wood is above foliage and reaches toward heaven.



Cascade style with drooping-type tree.



Cascade style with pomegranate on rustic root stand. The trunk is partly decayed (Saba-mike).

MAME BONSAI

Doris W. Froning



Life size photo of false heather
(*Cuphea hyssopifolia*) begun
from cutting five years ago

Peter Chvany

A mame is usually any plant kept 6 inches or less tall and trained in bonsai style. It is a miniature even by bonsai standards. Mame, pronounce mah-may, means "little bean" in Japanese. Plants that can be grown as large bonsai can be grown in this miniature style provided they have naturally small foliage, short internodes and small flowers and fruit.

Attention to detail, including careful watering of the correspondingly small containers, is very important in mame bonsai. The shape of the plant can be the same as with larger bonsai but the grower is almost working with a shorthand version because there are rarely more than three branches. Some departure from traditional standards is acceptable because a graceful tree in a small pot is preferable to a stiff tree that follows all the rules. However, even the smallest mame must be well shaped. Putting a rooted cutting into a small pot and calling it a mame bonsai is wrong. Any plant needs some training to qualify as a bonsai.

Training a mame bonsai can be done with copper wire, using only the finer grades, 18, 20, 22, 24. However, if the new grower finds using wiring difficult at first, plants can be

scissar-trained. It takes a little longer to shape a mame bonsai with scissors, but this method is safest for a beginner.

Once a tree is in a small pat the trunk increases in girth very slowly. If possible, start with a plant having a thick trunk. Before transplanting it to the mame container, gradually reduce the size by repeated pruning of top and roots. If you want to grow the plant in a very tiny pat, 2-inch diameter or less, then use a rooted cutting or seedling and train the plant as it grows in the mame pat.



Philip B. Mullan

One-hand, or mame, bonsai of *Juniperus squamata* 'Prostrata', 12 years old. Trained in container 8 years.



Small-leaved forms of Japanese holly (*Ilex crenata*) can make fine mame.

Philip B. Mullan.

When natural light is lacking

THE FLUORESCENT LIGHT GARDEN

Margery Craig

MANY indoor bonsai can be grown successfully under fluorescent light. In fact, plants often do better there because their cultural needs may be more easily met in the controlled environment of the light garden than in the varied conditions of windowsills around the home. Ideally, the light garden provides a winter growing area for subtropicals that have summered outdoors in full sunlight, but for apartment dwellers who have limited outdoor space, the lights can be used year round.

Plants to Grow

A great variety of plants will adapt to fluorescent light culture. Serissa grows and flowers continuously during the winter months, while gardenia (*G. jasminoides radicans*), Barbados-cherry (*Malpighia glabra*) and dwarf pomegranate (*Punica granatum nana*) also bloom, but less frequently. Plants native to very warm climates like bougainvillea bloom under fluorescents in late January; pyracanthas and azaleas from milder parts of the temperate zone bloom in early spring.

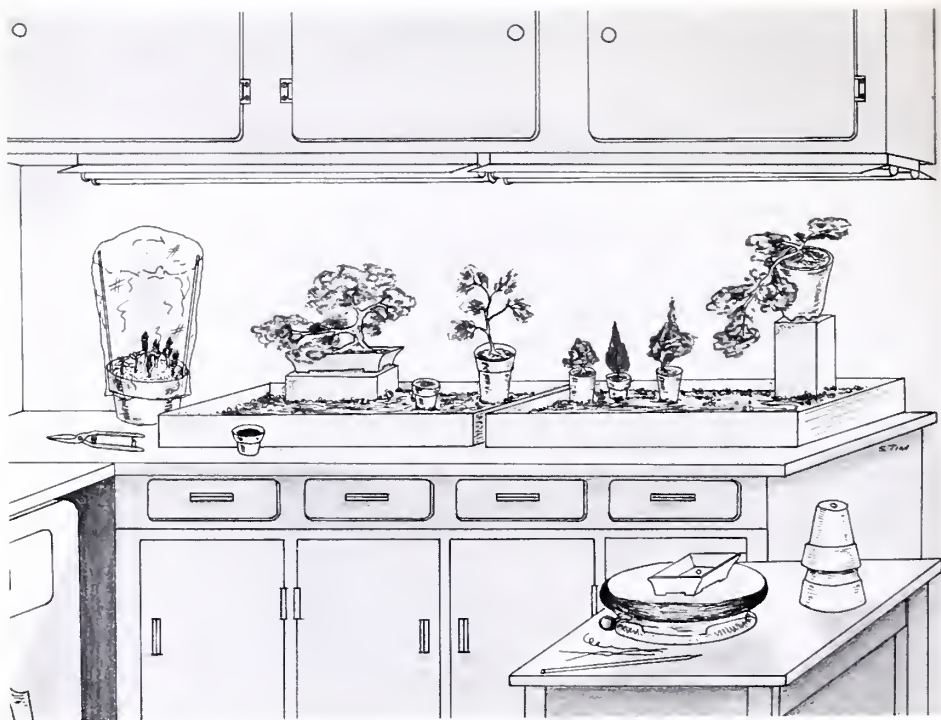
Among the evergreen plants that grow throughout the winter are podocarpus, various cypresses, Japanese box (*Buxus microphylla*), weeping fig (*Ficus benjamina*), creeping fig (*Ficus pumila*), English ivy (*Hedera helix*), olive (*Olea europaea*), junipers and false-cypresses (*Chamaecyparis*). Other types of plants will rest for two or three months during the winter, then start active growth in early spring. Examples of these are Natal-plum (*Carissa grandiflora*),

willow-leaved fig (*Ficus neriifolia regularis*), *Camellia sasanqua*, brush-cherry (*Syzygium paniculatum*; synonym, *Eugenia myrtifolia*), Chinese elm (*Ulmus parvifolia*), limeberry (*Triphasia triphylla*), lantana and hibiscus.

The light garden may also be used to start cuttings and seeds for indoor or outdoor bonsai. A clear plastic box containing a 2-inch layer of coarse, screened perlite makes a convenient cutting box as well as a good place to store fingertip-size mame bonsai during long weekends and vacations. The perlite, which is moistened, maintains a humid atmosphere but is sterile so that damping-off or other fungus growth is seldom a problem. If there are two or three small holes in the top and in the bottom of this box for air circulation and drainage, mame bonsai can be kept alive for a week or two without attention. As a cutting box, it rarely needs any care. After the initial watering when the cuttings are made, it should be checked monthly, but no additional water should be added unless the perlite is dry to the touch.

Design

The design of the light garden can be as varied and decorative as space and ingenuity allow. It has the great advantage of being flexible in size so that units may be added as desired. Commercial fluorescent units are available at garden centers but for those wishing to design their own, most of the necessary materials are available at hardware or building-supply stores.



S. K-M. Tim

An indoor light garden installed under cabinets on a kitchen counter, handy to sink and easy to clean.

In choosing the length of fluorescent tubes, it is useful to remember that light intensity diminishes at the ends of any fluorescent tube. For this reason longer tubes are more efficient than shorter ones. The 48-inch tube is a convenient basic unit and the light garden may be made up of multiples of this readily available size.

A typical light system consists of two 48-inch tubes mounted in single strip fixtures spaced 6 inches apart on the underside of a shelf or stand 20 inches above a

table or the shelf below. Two standard 11- x 22-inch waterproof plastic plant trays fit conveniently under each pair of lamps. To give varied distance to the lights for different size plants, one of the trays may be set up 3-4 inches on an overturned flat or on blocks of wood. The ballast from the fixtures may be removed and mounted separately to save space and reduce heat in the plant area. A reflector above the lights is not required if the shelf on which the tubes are mounted is painted with super-white flat paint.

Green plants cannot use all wavelengths of visible light. The red and blue ends of the spectrum promote plant growth and flowering, so fluorescent tubes which provide greater light intensity in these areas will produce more lush growth. I have found that Verilux Tru-Bloom tubes are very satisfactory, as are the Gro-Lux Wide Spectrum bulbs. The improved deluxe cool white and warm white tubes now also have increased output in the wavelengths plants can use. For maximum growth the tops of the plants should be no more than 4-6 inches from the lights. An appliance timer set for 14-15 hours per day can be used to turn on the lights automatically.

Growth Requirements

The humidity required for healthy plant growth should be provided by placing a half-inch layer of pebbles in the bottom of the plant trays and keeping this covered with water. To prevent the soil from taking up this moisture, the pots should rest on a support above the level of the water. A convenient support may be made from "egg crate" nylon fluorescent light diffusers available at building supply stores. This is sawed to fit snugly into the tops of the plastic trays which taper and support the diffuser above the water level. If the temperature in the growing area ranges between 60-65°F this arrangement will provide sufficient humidity. Some plants require greater heat and humidity. This may be obtained by taping a 75°F heating cable in the bottom of the trays before the pebbles are added.

The final cultural requirement for successful light gardening with indoor bonsai is to have good air circulation both in the air around the plants and in the soil. The first need can best be met with small fans designed to run at low speed. One fan hung in each 48-inch unit moves enough air to keep the plants healthy. On the second point, the soil mix must be carefully prepared and proper attention given to watering only as often as the soil dries. This will vary with the size of the pot. Very small bonsai require water every day. Most larger plants need water only once or twice a week.

For indoor plants to thrive, the soil must drain very rapidly. To accomplish this, all the components in the soil mix should be screened and particles passing through a 1/16 inch mesh window screen should be discarded. A potting soil made up of two parts sharp coarse sand, one part near-neutral potting soil, and one part well-decayed compost is a good general mixture. Peat moss or acid potting soils should be avoided because some mild-climate plants grow in quite alkaline conditions in their natural habitat and may not do well in an acid potting mix even if lime is added. Barbados-cherry and bougainvillea are striking examples.

Fertilizer should be given only to those plants which are actively growing. Alternate use of fish emulsion (nutrients released slowly) and a water-soluble fertilizer (nutrients released quickly) works well. In general, employ a high-phosphate type of fertilizer for plants grown for their flowers, an acid type for azaleas and gardenias and an equal-analysis type for evergreen and deciduous trees grown for their foliage. Better results are obtained with frequent very dilute fertilization rather than full strength once-a-month applications. One-eighth teaspoon per gallon can be used at every other watering.

Finally, pest control is best dealt with by prevention. When plants are brought in from summer growing they should be inspected carefully and given a precautionary spraying with malathion. Any new plants acquired during the winter should be quarantined for a week in a sunny window to make certain they don't harbor any pests. If there is an outbreak of aphids, white flies or spider mites, the most common indoor pests, the synthetic pyrethroid sprays will usually control them. Water-emulsion aerosols such as Hyponex Bug Control do not damage foliage and are safe to use indoors provided label instructions are carefully followed.

For more ideas on light garden design and new improvements in indoor culture the Indoor Light Garden Society of America publication offers a wealth of information. Address: 128 West 58th Street, New York, New York 10019.

Start with character . . .

KINGSVILLE DWARF BOX AND SERISSA

Albert J. Lake

INDOOR BONSAI, outdoor bonsai, "instant" bonsai, mame bonsai—whatever! The prime factor is to find a decent tree or plant to work with. Some plants will never make a bonsai, others can be turned and wired into a presentable or even a good one. The best way to make a proper bonsai is to find a plant with at least some measure of character to start with.

The average garden center seldom offers much in the way of proper bonsai material for indoors. Therefore, the enthusiast must seek out a rare plant nursery or a bonsai establishment, or inquire among members of bonsai clubs, horticultural societies and arboreta. The satisfaction and excitement of finding good material more than justifies the time spent.

Kingsville Dwarf boxwood (*Buxus microphylla* 'Compacta') may be rather difficult to find in garden centers*, but it is probably the aristocrat of all indoor bon-

sai. This magnificent plant, generally petite in size, with its tiny leaves, remarkable branching and aged-looking bark is superb in every respect. It was introduced many years ago by the late H. J. Hohman of Kingsville Nurseries in Maryland and has steadily gained the favor of bonsai enthusiasts.

Kingsville Dwarf box is extremely slow growing. It is not particularly fussy about soil so long as there is good drainage and good light. Partial shade or filtered sunlight is best, although once acclimated in the home it can get along nicely with no direct sunshine at all. Growth may amount to no more than a quarter- or half-inch a year. New leaves are a handsome light green, contrasting delightfully with the darker older foliage. When

*—ed. For a list of mail-order sources see Brooklyn Botanic Garden Handbook No. 63, *1200 Trees and Shrubs—Where to Buy Them*.

Marge Craig



Kingsville dwarf box, only 17 inches high after many years in training.



Eighteen inch Kingsville dwarf box, from nursery stock 8 years ago. Needs cool window in winter.

Gregg R. Wadleigh

grown as an outdoor shrub it is hardy in most of the northern states, but the leaves will bronze in winter. As an indoor bonsai the foliage remains green year round. Often, perfectly charming bonsai can be fashioned from the Kingsville Dwarf box by pruning and pinching alone—no wiring needed!

A fifty-year-old specimen is only about 20 inches tall; eight- to twelve-year plants may reach 6 or 7 inches in height; four-year plants are about 3 inches tall. Spread is likely to be wider than the height. Regardless of size, Kingsville Dwarf never fails to enchant all who see it.

Kingsville Dwarf is one of the relatively few plants from the cool-temperate zone that makes a good indoor bonsai. It is derived from an Oriental species which should not be confused with the common box (*Buxus sempervirens*).

Serissa

In contrast, a fast grower for indoor bonsai is serissa (*S. foetida*) in its various forms. It can grow from a cutting to a 15-inch tall miniature tree in two years or less, and can be shaped and pruned along the way. In fact, after reaching the desired size, it must be pinched frequently to maintain its bonsai shape.

The very small, glossy leaves of serissa resemble a dwarf box, but this shrub from southeast Asia is a member of the large Coffee Family (Rubiaceae). A variant with very narrow yellow leaf margins, is quite distinctive. There is also a double-flowered form commonly known as the snow-rose whose tiny white blossoms do indeed look like roses. Serissa and its forms are gaining favor steadily among indoor bonsai enthusiasts—and rightfully so.

CAMELLIAS AND GARDENIAS

Lynn Perry Alstadt

Most people think of camellias as being too large in flower and leaf to make good bonsai. This is true of the common varieties grown in mild-climate gardens the world over for their conspicuous saucer-like blossoms and bold, shining green foliage. However, did you know there are genetic miniatures available from specialist dealers? They make prime bonsai candidates if you have a home greenhouse or unheated sun porch where the air is cool and humid.

My favorite miniature camellia is 'Bob's Tinsie', which a friend brought me from California six or seven years ago. The growth habit of the plant is compact and very upright. It begins to flower in a cool greenhouse (55°F) in early December and continues until April. As soon as it has flowered, the new growth, which is light green with bronze edges, begins to appear. I pinch it back early to two new leaves. The plant will then develop both vegetative and flower buds in the axils of the two remaining leaves for the following year. Too many flower buds usually

form, and I remove about half. Even so, last year 'Bob's Tinsie' had fifty blossoms.

My miniature camellias are transplanted every two years, when new growth begins. The potting mix is one part peat moss, one part terra green (or sand), and two parts soil. The roots are not cut drastically during repotting. I do it gradually over two or three potting sessions (four to six years).

Gardenias

There is a dwarf gardenia (*G. jasminoides radicans*) that I grow as an indoor bonsai, too. It has long, narrow, shiny leaves and creamy white flowers about the size of a fifty-cent piece. This plant is a compact, vigorous grower which must be pruned hard yearly to maintain its bonsai form. Although it is an evergreen, the three-year old leaves are shed after the plant flowers in June. Cuttings root readily in a mixture of half sand and half peat, which is also a good growing medium.

Philip B. Mullan



Gardenia jasminoides radicans, natural dwarf about 4 years old, 3 years in training, unfinished form.

Camellia sasanqua, in training 7 years, informal upright form.



Philip B. Mullan

Gardenia jasminoides radicans has attractive golden yellow fruits in autumn, but only if time has been taken in spring to cross-pollinate the flowers with a small brush. This must be done over a period of ten days to three weeks because the plant doesn't bloom all at once. However, it's worth it because a second season of interest is gained thereby.

Growing a gardenia in the house is sometimes difficult. Either it's too hot and dry, or too cold and wet, or too drafty. Such an array of possible problems! However, there is a way to grow the gardenia satisfactorily without consigning it to a greenhouse. Set the container in a clear polyethylene bag and draw the bag about half way up around the plant. Keep in an east window in winter. (If a south window must be used, place the plant back several feet from the sill to prevent overheating.) The bag treatment conserves moisture and excludes drafts, thus helping to keep temperatures sufficiently even for good growth.

Care

As with all my bonsai, I spend extra time pruning the new growth of camellias and gardenias so they won't have to be wired.

However, if it becomes desirable to wire them, I wait until flowering stops and new growth begins to mature. The wire is kept on for only a brief period (three to six weeks) because of the plants' vigor and the danger of the wire marking the branches. I rewire then only if necessary. A time-release fertilizer is applied in spring and again in autumn.

Pests, notably aphids and cottony scale, appear from time to time. Both are bothersome to eradicate. I apply an appropriate insecticide if the infestation is heavy. If it is light, a water spray with mild soap, followed by a rinse, is usually enough. Maintaining bonsai plants in a clean condition all of the time is the best preventive measure against insects and disease, so as a weekly procedure I turn on a bonsai microspray watering attachment a little harder than I would for normal watering and aim the spray up underneath the foliage. Snails like to eat the flowers of the camellias in my greenhouse. I don't care to have poisonous baits around and have found that saucers of beer control these pests well.

A final note. Both camellias and gardenias benefit from spending the summer outdoors in the filtered light of high-branched trees.

THE ORNAMENTAL FIG

J. Richard Bowen

THE GENUS *FICUS*, which is best known among temperate-climate gardeners for the common fig, includes many ornamental species of trees, shrubs and vines from the warmer parts of the world. Some of them rank with the largest plants known to man, others are only tiny creepers. The ones suitable for indoor bonsai need good light, warmth and humidity.

In the winter I keep my ficus and other indoor bonsai on card tables in a corner of a bedless bedroom where there is light from a side window and above through a 3-foot-square skylight. The plants sit in pots on plastic trays that contain water. I gave up the idea of using pebbles for a base as it is too difficult to keep the trays clean. The water level is below the drain holes of the pots, of course, so plants don't become waterlogged.

I have a five-tree grove of the willow-leaved fig (*Ficus neriifolia regularis*) that requires frequent but light feeding year round. There is also a Chinese banyan (*F. retusa*) on a piece of lava; it needs very

little fertilizer. A loose, gritty soil mix seems to work well for these plants. It consists of half sand and half garden loam (pasteurized), with only the coarser pebbles of sand being used after screening. The fertilizer I favor is fish emulsion (usually 5-5-1).

The ficus grove has given us particular pleasure, but it does have an occasional problem. Every spring it is attacked by spider mites, which are very tiny. They are virtually colorless and shed their skins like snakes. These minute creatures clutter up the leaves and look dreadful—under a microscope, that is. A way I have found to control them is to dunk the plant in mild, soapy (not detergent) water, and thoroughly rinsing. I place the pot in a plastic bag and wrap the end around and over the soil to prevent it from spilling out, and then I invert the plant in the water. It is a little difficult because the top of the bonsai is 22 inches above the container, but dunking in this manner washes off the mites.

Philip B. Mullan



Two-tree slanting style of weeping fig is symbolic of husband and wife. Four years old, 1 year in training.



Five-tree grove of
willow-leaved fig, in
training 6 years.
Author's collection.

Peter Chvany

Peter Chvany



Weeping fig, 28 inches, in training
15 years but redesigned 3 years ago
as indoor bonsai.

Beautiful and easy to grow . . .

THE MYRTLE OF THE ANCIENTS

Elizabeth N. Hume

WOULD you like an uncommon indoor bonsai that is beautiful and easy to grow? Then search the garden marts and florist shops until you find the common myrtle (*Myrtus communis*). It is usually a small but very leafy potted plant of deepest green, with a scattering of bead-like buds and dainty white, mildly fragrant flowers. The evergreen leaves when crushed have a strongly aromatic, spicy scent—somewhat reminiscent of an Oriental bazaar—and are utterly delightful. For added interest the plants form bluish-black berries when growing conditions are good. They are reportedly non-poisonous, but take no chances.

If you plan to create an upright miniature tree form, be sure to check the main trunk and the placement of the branches before purchasing a young plant. Actually myrtle wood is strong and resilient—nearly as lithe as willow, and it adapts well to almost any style that is desired. New growth sprouts from the trunk at times, quite unexpectedly. The new shoot or shoots can, if you wish, become well placed branches in a surprisingly short time. This is another plus for a most obliging little tree, particularly if you are new to bonsai and have made a mistake in pruning.

It is possible but not likely that you will one day come upon a large and fine specimen in a nursery greenhouse. Chances are it won't be for sale, for with it would go sentiment and symbolism from an old family enterprise. If you are young, start your own, grow it without benefit of much pruning, and no doubt you will not part with yours either in twenty or thirty years.

History and Legend

Myrtle originated in West Asia, the very cradle of civilization. It symbolized peace at the burial of the dead in many of the Middle East countries, and it is mentioned in the Old Testament in the Bible: "And he stood among the myrtle trees"

Zechariah I.

In Greek mythology, Venus, goddess of love, youth and beauty, is portrayed rising from the sea bearing a spray of myrtle. To this day it is traditional in many European countries to include a sprig of myrtle in the bridal bouquet.

Historically, myrtle crowned the heads of Roman generals home from the wars and garlands decorated their temples and perfumed their halls of revelry. It is conjectural that these same generals introduced the myrtle to the shores of England and the Channel Isles. Later, very much later, these towns and islands supplied quantities of cut myrtle boughs in large bundles to Covent Garden in London, where they were sold to decorate the massive mantles and perfume the sleeping quarters of many a stately home in the 17th and early 18th centuries. No lady of the time was without her myrtle. Enough perhaps of history, legend and lore. Our subject is indoor bonsai, and this new way of growing plants is of consuming interest to more and more people.

Care

Using bonsai principles and techniques, city-dwellers can now achieve decorative results of which they can be very proud. For the traditional bonsai person the joy of growing and creating with subtropical



Yuji Yoshimura

Small-leaved myrtle (*Myrtus communis* 'Microphylla') group planting. The tallest is 15 inches.

material the year-round is indeed a whole new field.

The common myrtle is of easy culture for the beginner. I would suggest growing it for a while as a house plant before repotting or styling. Get to know its requirements and study its artistic possibilities. The chances are that the plant will flower best for you if it has good light and is not allowed to dry out thoroughly between waterings. Watch for scale insects and other pests and control them with an appropriate insecticide according to directions on the label.

When you do transplant, use a potting mixture of loam, humus, a generous amount of sharp sand for drainage and a pinch of slow-release fertilizer.

Myrtle responds quickly to feeding whenever a burst of fresh new green is desired, but it is able to cope with minimum care and maintain its attractiveness throughout the winter months—marking time, of course, for a spring display of foliage that is truly beautiful. During the active growing season an occasional application of a balanced fertilizer having a 12-15% nitrogen formula (diluted in twice as much water as the package recommends) keeps the leaves in good color.

Because the common myrtle has been grown since the earliest of times, it should be no surprise that a number of cultivated varieties have occurred. There are at least two with variegated foliage, the one with



Yuji Yoshimura

Myrtus communis 'Microphylla' twin trunk, 21 inches high.

the smallest leaves being especially choice. Each makes a fine display against a dark background and gives the striking illusion of a plant in bloom—or a tree in sunshine.

Size is not the most important criterion for an excellent bonsai, but the perfect tree of small stature is indeed the ultimate aim of many connoisseurs. The common myrtle is a splendid candidate for this purpose. The tiny leaves of a well formed plant bear silent testimony of tender loving care

throughout the year.

Final note: It might be wise to mention that periwinkle (*Vinca minor*), a hardy ground-cover plant, is sometimes called myrtle, too. How or why it received this misleading name is a mystery to me, for it bears no resemblance and is not even a member of the same botanical family. To avoid confusion when ordering the true myrtle of the Ancients, be sure to include its botanical name, *Myrtus communis*.

HERBS AND SUCCULENTS

Eleanor Thatcher

BONSAI techniques are being applied to all sorts of plants these days. Herbs and succulents are among the ones that have caught our interest at the Kathryn S. Taylor Greenhouse of the Massachusetts Horticultural Society in Waltham. This may come as a surprise to readers who think of bonsai in traditional Japanese terms. Succulents, which are often characterized by thick, fleshy leaves, represent in good part the deserts of the world, while herbs evoke an image of parched Mediterranean lands. Yet, both groups are tremendously varied, and the innovative grower has many choices.

Herbs

Herbs present delightful possibilities. It might be stressed first that we are not restricting the word 'herb' to its botanical meaning (*i.e.*, a non-woody plant) but are including some woody or semi-woody plants that have traditionally been associated with kitchen, medicine or fragrance. For indoor bonsai select the herbs that do have a woody stem, such as the versatile rosemary (*Rosmarinus officinalis*), which over the years has had at least a hundred other uses—many of them less orthodox. This ancient herb, the symbol of remembrance, is noted for its aromatic, very narrow, dark green leaves and small blue flowers, which appear in spring. Rosemary may be grown in a south window or, even better, under artificial light. Plants can be trimmed and shaped into interesting art forms in only a year or two. Variety 'Prostratus' is also choice for our purposes.

If you succeed with rosemary, you might like to try some of the other classic Mediterranean herbs that are part woody and have refined foliage. Several of them have been popular in Elizabethan-type knot gardens as dwarf, clipped hedges. Among the appropriate candidates are: germander (*Teucrium chamaedrys*), with

small, shiny green, notched leaves; lavender (*Lavandula* spp.), narrow gray foliage; sage (*Salvia officinalis*), larger gray-green leaves; santolina with either silvery foliage (*S. chamaecyparissus*) or green (*S. virens*); common thyme (*Thymus vulgaris*); and winter savory (*Satureja montana*). Some of these have flower spikes rising above the leaves—best cut them off in the training stage. Lemon-verbena (*Aloysia triphylla*; formerly *Lippia citriodora*), a native of South America, might also be tried.

All of the above plants may be expected to perform best in a cool greenhouse in winter, or on a sunporch. They also do well grown under artificial light in a cold room. If these conditions can't be provided, try a southern window in a room which is cool at night. Herbs are not true house plants for the most part but can cope if you are able to give the proper environment.

Herbal Trees and Shrubs

Trees and larger-growing shrubs have been used in herb gardens since ancient times. They were trained, shaped, clipped and sheared to form various patterns. Because some species were not hardy in frost zones, they had to be brought indoors and grown in tubs and boxes.

A few of them, such as the calamondin orange (*Citrus mitis*) and sweet-olive (*Osmanthus fragrans*) were brought from the Orient to the West, where they eventually became associated with herb gardens, but most were of European or Eurasian origin. They include English or common box (*Buxus sempervirens*) and English holly (*Ilex aquifolium*), neither of which is particularly Anglo-Saxon despite their vernacular names; also certain junipers (for their religious associations), myrtle (*Myrtus communis*) (see page 44), and the olive of commerce (*Olea europaea*). English ivy (*Hedera helix*)



George Hull

Jade plant (*Crassula argentea*)
before bonsai styling.

Same jade plant after pruning
and repotting.



George Hull

also has a similar association. Because most of these plants have been cultivated for many years, in some cases from the time of man's earliest memories, it is not surprising that a number of variants exist. The innovative bonsai grower will want to seek out small-leaved or naturally dwarf forms.

Succulents

Some succulents—with a little bit of imagination, look like small pine trees. Others gradually drop their lower leaves giving an attractive bonsai effect as their trunks develop. Many, such as the miniature geraniums, which are succulents or herbs depending on your view, have attractive flowers. Small succulents lend themselves well to mame (miniature bonsai) or saikei (group plantings).

At the Taylor Greenhouse most of the succulents used for bonsai come from the Stonecrop Family (Crassulaceae). Certain crassulas have been popular house plants since Victorian times. One often sees large old specimens that have passed through several generations, handed down from parent to child. To me, crassulas seem perfectly suitable as an upright style of bonsai.

My favorite succulent is *Aeonium domesticum*, which apparently has no common name although it is grown by the thousands in southern California and in greenhouses around the country. Probably a hybrid from the Canary Islands, this small plant of the Stonecrop Family forms rosettes of leaves on single or branching stems. As it matures, it drops the lower leaves and takes on the appearance of a bonsai tree.

Other appropriate succulents include *Crassula lycopodioides*, *C. pseudo-lycopodioides* and *C. tetragona*. Best known, of course, is the jade plant (*C. argentea*) (see page 7). All of these are from South Africa.

Two other plants from South Africa deserve a word here. One of the most distinctive for bonsai purposes is *Portulacaria afra*, a very stout member of the Purslane Family which elephants are accustomed to browse upon in the wild—hence the common name, elephant bush. It has a variegated form, too. The other species that makes an interesting bonsai-like plant is *Trichodiadema bulbosum*, a representative of the Iceplant Family with carrot-shaped roots.

Culture

Despite their different origins and appearance, herbs and succulents have several things in common when their cultivation is considered. Most of them grow best in good light, actually very strong light. Neither is harmed by summer heat; in fact they thrive on it. In winter the

herbs are best kept on the cool side at night and are more difficult to grow as house plants. Water requirements for both are light to moderate depending on seasons of growth. Don't let succulents or herbs sit in water for any length of time.

We use our own general potting mix, which consists of two parts garden soil (pasteurized), one part peat moss and one part perlite or sand. To this a little dolomitic limestone and a complete granular fertilizer (5-10-10 or 5-10-5) are added. However, a commercial soil mix works well too, and is easier for the apartment dweller to use.

Apply a balanced low-nitrogen fertilizer at half strength (or less) when plants are in active growth. If you are an "organic" gardener, try fish emulsion at half strength. If the growing medium is sterile, best employ a liquid fertilizer, not a granular one. In all cases, tend to underfeed than overfeed. One final note: avoid using the insecticide malathion on members of the Stonecrop Family; severe damage may result.

Philip B. Mullan



Twelve year old olive (*Olea europaea*), an herbal tree.

100 PLANTS FROM A TO Z

Constance T. Derderian

SOME are easy, others require a little more effort. All of them make distinctive indoor bonsai. Find the ones that suit you. Don't forget that houses in warmer parts of the United States are often built to exclude sun. Houses in northern climes admit more light.

Many of the plants listed below can stand lower temperatures than coded. Temperatures in the code represent an optimum.

Most plants need very good light to flower and fruit well. If you can't provide it, select plants primarily grown for their foliage—or install an artificial light unit.

Plants will usually grow more rapidly with added humidity.

If leaves fall because plants are over- or underwatered, don't panic. Keep watering lightly and the chances are that new foliage will grow again in several weeks. Also, remember that newly purchased plants, or recently repotted ones, often suffer shock in the home. Treat the patients with patience.

In general, when repotting is necessary, do it in midwinter or very early spring before the plant is actively growing.

The following code is for winter care. Summer temperatures can—and will—be warmer. The plants in the following list are evergreen or nearly so, except where noted.

The Winter Code

- 1—House temperatures of 60° night to 75° F day. Good light, not necessarily sun.
- 2—House temperatures of 60° night to 75° F day. Provide as much sun as possible.
- 3—Cooler by about 10° than normal house temperatures. Give good light or some sun.
- 4—Difficult to grow in the average home. Learn about plant's needs. (A combination of numbers, e.g., 3-2, indicates

that the plant grows best at a cool temperature but can adapt to a somewhat warmer one.)

Acacia baileyana—Golden Mimosa. (3).

An Australian tree noted for its feathery silver-blue foliage. Give it a cool winter temperature. Don't repot every year.

Acacia farnesiana—Sweet Acacia (2). A

South American species which adapts to warm winter temperature in the home better than the preceding. Both have fragrant flowers.

Araucaria heterophylla (excelsa)—

Norfolk Island-pine (1). One of the best known tall trees of the subtropical landscape. In the home it tolerates winter heat and dryness.

Bougainvillea species and cultivars. (2).

What visitor to mild climates doesn't admire this beautiful climbing shrub? Plants flower best in strong light. In the home bougainvillea will drop leaves if too wet or cold.

Bucida buceras— Geometry-tree,

Black-olive. (1). Often grown as a street tree in Florida. This Caribbean species is almost self-shaping as a bonsai.

Bucida spinosa—Dwarf Black-olive. (1).

Keep very moist. Root prune lightly in midsummer or midwinter. More difficult to find in the trade than the preceding, but charming to grow. See page 65.

Bursera simaruba—Gumbo Limbo or

Tourist-tree (because it is always red and peeling). (1). A Caribbean species grown for its interesting red bark. In the Deep South it roots as easily as a willow does in the North—just stick a young branch into the ground and keep it watered. As an indoor bonsai it tolerates winter heat and dry soil.

Buxus harlandii. (1). A relatively little-

known dwarf Chinese box which tolerates heat and dryness.

Buxus microphylla 'Compacta'—Kingsville Dwarf Box. (1). Don't overwater or overfertilize. (Also see page 38.) Same for *B. m. japonica* and *B. m. koreana*.

Calliandra emarginata—Dwarf Red Powder-puff. (1). Leaves fold up at night. Flowers in ratio to light. Same for *C. haematocephala* (*inaequilatera*) and *C. surinamensis*.

Camellia japonica. (3 or 2). Give it acid soil. Buds drop if too warm or dry. See page 40.

Camellia sasanqua. (3). Do not overwater.

Carissa grandiflora—Natal-plum. (1). A familiar boy-proof hedge in mild climates because of dense, thorny growth. Dwarf, small-leaved cultivars of this South African shrub with rounded-oval, sharp-tipped leaves have become popular in the southern California and Florida landscapes. Old plants resent heavy root pruning. In the home Natal-plum grows best in strong light. Sun is needed for the fragrant white flowers and for the edible fruits, which are red and have a pleasant flavor. Also see page 65.

Cassia marilandica—Wild Senna. (1). A native medicinal plant of the eastern United States with semi-woody stems and refined compound leaves. The yellow, pea-like flowers appear almost continuously when wild senna is grown in partial sun.

Chaenomeles japonica—Japanese Flowering Quince. (3). Can grow in warmer temperature if humidity is good. Deciduous. Strong light is needed to produce blossoms, which are bright orange.

Chamaecyparis pisifera 'Plumosa'—Plume-cypress, "Faith-tree", (3-2). Although the false-cypresses are mostly from the cool-temperate regions and are associated with traditional bonsai, some will perform well indoors. This Japanese variant with delicate frond-like branchlets will grow in slightly warmer winter temperatures than indicated by the code if the foliage is frequently misted.

Chamaecyparis pisifera 'Squarrosa'—Moss-cypress. (3). Has small feathery silver needles. Same culture as above.

Cinnamomum camphora—Camphor-tree. (2). An Oriental species often grown as

Philip B. Mullan



Plume-cypress
(*Chamaecyparis*
pisifera 'Plumosa').
clasp style. Six
years old, still in train-
ing. It will take
another five years
for the roots to
become exposed.

Otaheite orange (*Citrus taitensis*), left, 19 years in training, protects a little companion, *Juniperus formosana*, 11 years old.



Philip B. Mullan

a street tree in very mild parts of the United States. Foliage is dense and glossy. Leaves are somewhat large but can be reduced by bonsai techniques. The camphor of commerce is distilled from this tree.

Cissus rhombifolia—Grape-ivy. (1). An attractive South American vine which nearly everyone sooner or later grows as a house plant. It tolerates heat, dry soil, poor light and inexperienced gardeners. Give the grape-ivy some tender loving care and see how beautifully it responds.

Citrus species—Calamondin, Marco Orange, Otaheite Orange, Seville Orange, Meyer Lemon, Grapefruit, etc. (3-2). Give them acid soil and fertilize regularly. Once their needs are understood they are easy to grow.

Clerodendrum thomsoniae—Bleeding-heart Glorybower. (1). Shrubby West African vine noted for its red flowers, long stamens and white calyces. Long period of effectiveness. Keep plants well watered and pinch new vining growth to maintain shape.

Coccoloba uvifera—Sea-grape. (1). A bold coastal fixture in mild climates. The shrub is tolerant of heat and dry

soil. Do not over-water. Also see page 69.

Conocarpus erectus—Buttonwood. (1). A native shrub or tree of southern Florida, the Bahamas and West Indies. Slender, leathery, gray-green foliage. Plants must be well watered. Do not repot every year. Trained more satisfactorily by pinching than wiring. Also see page 66.

Cotoneaster species and cultivars. (3). Seek out the low-growing, small-leaved sorts such as *C. microphyllus* and its variety *cochleatus*. They make excellent mame.

Cryptomeria japonica—Cryptomeria. (3-2). This monarch of the Japanese forests wouldn't appear to be a candidate for indoor bonsai, but it can be grown. One of the most beautiful conifers. Plants sold as *C. j. nana* usually adapt more easily than the species. Give them as much humidity as they can get.

Cuphea hyssopifolia—False-heather. (1). A dwarf shrub from Mexico and Guatemala with small, very narrow leaves. The dainty purplish-rose flowers bloom all winter with a little sun. Great for mame. Don't let the plant dry

out—it isn't a very good convalescent. *Cupressus arizonica*—Arizona Cypress. (3). Several of the true cypresses, which are mostly from mild climates, can be grown as indoor bonsai. Keep the humidity high and don't let them dry out. The reduced light intensity in the home may cause the foliage of Arizona cypress to become gray-green instead of glaucous.

Cupressus macrocarpa—Monterey Cypress. (3-2). Nature does the pruning better on the windswept Monterey peninsula of California than we can in the home, but this is a relict species well worth growing. The foliage is bright green. Again, keep the humidity high and don't allow plants to dry out.

Distylium racemosum. (2) A dense slow-growing foliage shrub from Japan, where it can be a tree eighty feet tall, somewhat resembling Japanese privet but botanically akin to the witch-hazel. Planted mainly in California gardens but worthy of trial if you can locate a young plant.

Eugenia uniflora—Surinam-cherry. (2-1).

A shrub or small tree, originally from Brazil but widely grown in Florida, especially as a hedge. The foliage is glossy, with new growth being bright red. Excellent light is needed indoors for the development of the deep red fruits, which are edible. Give this plant slightly acid soil.

Eurya japonica. (2) Attractive shrub grown for its leathery deep green foliage. In the home keep the plant warm in winter and always well drained.

Ficus aurea—Strangler Fig. (1). A common tree of southern Florida, noted for its ability to subdue nearby competitors. Like many figs it develops aerial rootlets. In the home it tolerates heat and dryness. The leaves reduce drastically in size when strangler fig is grown as a bonsai. There are more than 600 species of ficus so the home grower is faced with many choices.

Ficus benjamina—Weeping Fig. (1). A well-known house plant in the North, a

Three sea-grapes (*Coccoloba uvifera*). Left: collected seedling, in container 1½ years. Center: started from seed 10 years ago, in container six years. Right: from nursery stock, in container 2 years.

Gregg R. Wadleigh



massive tree in the Deep South. As a bonsai do not overwater. This remarkable species from India may eventually develop aerial roots. A heavy crown encourages development. It withstands heavy top and root pruning.

Ficus diversifolia—Mistletoe Fig. (2).

Familiar house and patio plant with distinctive thick-textured leaves resembling inch-wide teardrops. This shrub from southern Asia is almost always in fruit. The fruit is small and greenish-yellow, and has character even if it is not colorful. Open, twisted branching. Of easy culture.

Ficus neriifolia regularis—Willow-leaved Fig. (1). Graceful tree from the Celebes and Moluccas with lax branches. As an indoor bonsai it develops aerial rootlets in time. Tolerant of heat, poor light and dry soil.

Philip B. Mullan



Ficus pumila minima—Creeping Fig. (1).

A dainty small-leaved climber derived from a species that is native to Japan, China and Australia. Foliage almost heart-shaped. The plant is excellent for mame but is a slow grower.

Ficus retusa nitida—Indian-laurel or Banyan. (1).

On visits to Florida, northern house-plant hobbyists are sometimes shocked to see the immense dimensions this tree can attain in the mild-climate garden. Still, it's an excellent glossy-textured indoor foliage plant. Even as a bonsai it may develop aerial rootlets in time. Indian-laurel stands heavy pruning. (See *F. benjamina* re: aerial roots.)

Fortunella hindsii—Hong Kong Wild Kumquat. (3).

A spiny little tree with leathery foliage and very small orange-red fruit. Allow it to become slightly dry between waterings, which should be thorough. Give the same care to Nagami kumquat (*F. margarita*).

Gardenia jasminoides radicans. (1).

Beware of temperature extremes. Requires good humidity. See page 40. *G. thunbergia* (3-1) is better in slightly cooler temperatures. Repot in midwinter.

Grevillea robusta—Silk-oak. (2).

Tall-growing, weak-wooded Australian tree with attractive foliage, frequently planted in California and Florida gardens for a quick effect. As an indoor bonsai, wire it when young and pliable because the branches eventually become brittle.

Guaiacum officinale—Lignum Vitae.

Hollywood. (2). Dense-growing Caribbean tree noted for its beautiful whitish-gray bark and very hard wood. Give it warm winter conditions and

Two-tree planting of Arizona cypress (*Cupressus arizonica*) in training 4 years. Grown from a cutting taken 8 years ago.

Mistletoe fig (*Ficus diversifolia*) in fruit. Wired in the cascade style and grown as a bonsai for 3 years, it measures approximately 12 inches across. The botanical name of this plant has recently been changed to *Ficus deltoidea*, but it will likely be a few years before this becomes commonly used in the trade.

grow it in the best possible light for its flowers, which are true blue. Train *lignum vitae* by pruning rather than wiring.

Hedera helix—English ivy. (1). Many small-leaved cultivars are available. Excellent for mame.

Hibiscus rosa-sinensis cooperi. (2). Striking plant for its variegated narrow leaves—a kaleidoscope of red, white and green. Flowers small, red. Allow the plant to become a little dry between waterings.

Hibiscus rosa-sinensis 'Snow Queen'. (1-2). The foliage is marbled in white, the flowers are rose pink. Grow in bright light for best leaf color and to produce blossoms.

Ilex aquifolium 'Angustifolia'—Narrow-leaved English Holly. (3). A very attractive cultivar with tight bushy growth and lustrous dark green foliage. The spiny leaves are one inch long and about 1/4 inch across. Keep winter temperature low and humidity high.

Ilex crenata 'Helleri'. (3). This Japanese holly is a popular garden shrub in many parts of the country because of its small, dense, deep green foliage and low mounded growth habit. When grown as a bonsai it is better shaped by pruning than wiring because the branches are brittle. The same with *I. c.* 'Microphylla'.

Ilex vomitoria—Yaupon Holly. (1). A southern holly with lustrous, rather small leaves. Pistillate (female) plants have red fruits if pollinated. A diminutive cultivar, 'Stokes Dwarf', resembles *Ilex crenata* 'Helleri'. When transplanting yaupon, prune the roots lightly and pot up quickly.

Ixora javanica—Jungle-Geranium. (2). Rugged hedge shrub in Florida with



Gregg R. Wadleigh

waxy reddish long-lasting flowers. Give it acid soil. Tolerant of poor light for growth but needs good light for bloom. 'Nor-nel', a dwarf ixora, is great for smaller bonsai.

Jacaranda mimosifolia (*acutifolia*). (2). Deciduous Brazilian tree planted throughout the milder parts of the world for its showy lavender-blue flowers and lacy bipinnate leaves. It is difficult to achieve flowers on the terminals and keep a good bonsai form because of the pruning involved, so grow *jacaranda* mainly for its foliage.

Jasminum dichotomum—Pinwheel Jasmine. (2). Climbing West African shrub with lustrous foliage and fragrant white flowers that open at night. It stands root and top pruning well. *Jasminum rex*, from Thailand, has larger scentless flowers appearing sporadically all year. Give it a warm winter temperature.

Juniperus procumbens 'Nana'. (3-1). This excellent dwarf form of the Japanese garden juniper stands heavy pruning as a bonsai. Keep the foliage thinned out and if the plant is grown under warm

conditions watch out for red spider. *J. squamata* 'Prostrata' (3), with very similar growth habit, also tolerates heavy pruning. Do not overwater. *J. chinensis sargentii* is less satisfactory indoors. All of these junipers perform best in the home with cool winter temperatures and high humidity. They are essentially outdoor, temperate zone plants.

Lagerstroemia indica—Crape-myrtle. (3-2). One of the best-known tall deciduous summer-flowering shrubs of mild climates, but hardy outdoors to Long Island. Flowers, usually pink to red, also range from white to lavender. Mildew on foliage is a problem in California and the South but can be controlled in pot culture with a systemic fungicide. Dwarf cultivars and color forms of this southern Asian species have been named in recent years. In the home crape-myrtle adapts to cooler winter temperatures. It needs bright light to flower. Tolerates heavy pruning.

Lantana camara and other spp. (2). Northern indoor growers who coddle lantana are often surprised to find it a common weed in mild climates. Even

so, it is a satisfactory bonsai in the home if the humidity can be kept high. Give the plant bright light if you want the attractive flowers to be abundant. Lantana tolerates dry soil; do not overwater. Pinch rather than wire.

Laurus nobilis—Bay. (3). This shrub is the true laurel of the ancient Greeks. In the home watch for spider mites. The leaves are slow to reduce in size.

Leptospermum scoparium—New Zealand Tea-tree. (2). The leaves of this shrub are needlelike and the flowers are sometimes reminiscent of miniature roses, although it is a member of the Myrtle Family. Numerous color forms have been named. Plants resent heavy root pruning and need good humidity in the home.

Ligustrum japonicum—Japanese Privet. (1-3). If a plant could sue for libel, the evergreen Japanese privet would take northern gardeners to court because of their calumny toward the genus, which is based entirely on the uninspiring deciduous sorts used for hedges in snowy areas.

Actually, Japanese privet, which Sun Belt gardeners know very well, is a good candidate for our purposes. True,

Philip B. Mullan



Hong Kong wild kumquat (*Fortunella hindsii*) in bonsai 17 years. Note the delicate, ½ inch, deep orange fruit.

Uprooted slanting style round-leaved Japanese privet (*Ligustrum japonicum* 'Rotundifolium') has spent half of its 30 years in bonsai training.



Philip B. Mullan

the leaves are a bit slow to reduce in size, but they will toe the line eventually. They are a rich and shiny green and this makes it worthwhile. If the thought of growing privet disturbs you, try 'Rotundifolium' (2)—it doesn't resemble one at all. Or, experiment with glossy privet (*L. lucidum*) (2), grown for its white flowers.

Lonicera nitida—Box honeysuckle. (2). Often planted as a hedge in milder parts of the United States, this shrub from western China has a good tight growth pattern and shapes easily. The creamy white flowers are fragrant, but the plant is worth growing as a bonsai for its refined foliage alone.

Malpighia coccigera—Singapore-holly. (1). A small shrub native to the West Indies despite its common name. One of the most frequently grown plants for indoor bonsai. The glossy leaves, which are tiny and spiny (some not at all), are always attractive, and the delicate light pink flowers appear sporadically year round. Don't overwater.

Malpighia glabra—Barbados-cherry. (1). A shrub grown in the Florida landscape for its ornamental merits and edible fruits, which have a high vitamin C content. It's splendid for a "weeping" bonsai style. Broken twigs will heal if not completely severed. See page 66. (*M. puniceifolia* is similar but with inedible fruit.)

Myrsine africana—African-box. (2). Foliage shrub with dark green, almost rounded leaves that are little more than a quarter-inch wide when grown as a bonsai. Red stems enhance the effect.

Myrtus communis—Myrtle. (1-2). Can be grown in many styles, including mame. See page 44.

Nicodemia diversifolia—Indoor-oak. (1). Foliage shrub from Madagascar with somewhat wavy lobed leaves that are prominently veined. They reduce in size well. Tend to pinching rather than wiring.

Nothofagus cunninghamii—Tasmanian-beech. (3-2). A very striking, very small-leaved, very tall-growing tree in

- its homeland. The biggest danger in the bonsai container is overwatering, but it shouldn't be allowed to dry out either.
- Olea europaea*—Olive. (1-2). Have you ever admired a neglected grove of gnarled old olive trees in Spain or Greece—or even California? Aged specimens have a character unmatched by any cool-climate fruit tree, except possibly the apple. As an indoor bonsai the olive is very tolerant of winter heat and dryness. Don't overwater it.
- Pinus eliottii*—Slash Pine. (2). See page 66.
- Pinus halepensis*—Aleppo Pine. (1). This species is tolerant of greater heat and dryness than practically any other pine. The needles are usually in twos and have a light green appearance. The tree isn't as refined as some of the northern pines but it can take indoor conditions—and that is what we are looking for. Do not repot every year.
- Pinus thunbergii*—Japanese Black Pine. (3). If you must have a traditional bonsai pine, this is one that can adapt to the indoor condition (cool room with good humidity and light, please). The bright green needles are in twos. Root prune lightly when repotting.
- Pithecellobium unguis-cati*—Cat's Claw or Black Bead. (2). Caribbean shrub or small tree with refined leathery bipinnate leaves and small yellow flowers. Remarkable claw-like seed pods. Member of the Bean Family. Shape by pruning.
- Pittosporum tobira*. (1-3). Dense shrub or small tree from milder parts of Japan and China. The closely set, leathery foliage is dark green, the flowers are white and scented. Often planted as an ornamental in the South and on the West Coast. Best shape it by pruning because of its growth pattern.
- Podocarpus macrophyllus maki*—Southern-yew. (1-3). Versatile, ultimately tall foliage shrub from milder parts of Japan and China. It is used in Florida and California gardens in basically the same way as the related but much smaller-leaved *Taxus* is in the North. Try it indoors. The southern-yew responds well to top pruning.
- Psidium cattleianum*—Strawberry-guava. (2). Keep it well watered but not sopping wet. See page 67.
- Punica granatum nana*—Dwarf Pomegranate. (2-1). A much used plant for indoor bonsai and mentioned several places in this Handbook. Tend to shape the plant by pinching rather than pruning. Keep the humidity high if possible. If you aren't the bashful type bring it into the bathroom when you take a shower.
- Pyracantha* species—Firethorn. (2-1). Northern gardeners know one species, the scarlet firethorn (*P. coccinea*), which in its several cultivars is a vigorous grower with prolific orange-red fruits. There are other species from generally milder climates which are better suited for our purposes: narrow-leaved firethorn (*P. angustifolia*), orange-red fruits; Formosan firethorn (*P. koidzumii*), relatively large, vivid red or orange-red fruits; Chinese firethorn (*P. fortuneana*; synonym: *crenato-serrata*), small leaves and profuse little red fruits. All of them have attractive white flower clusters in spring.
- When grown as indoor bonsai, the firethorns bear fruit which is very persistent, a trait that will be appreciated by outdoor gardeners whose bushes are often quickly stripped of bounty by carousing robins. In the home these recommended firethorns are tolerant of winter heat and dry soil. Performance seems better in slightly alkaline soil.
- Quercus* spp. (4-1). All of the true oaks are slow and difficult to grow indoors. Unless you are fairly experienced with bonsai best concentrate on other plants in this list. However, if you would like to try these noble trees, start with young plants; root prune lightly and not every year.
- The oaks that have a reasonable chance for survival as indoor bonsai are species from warmer climates such as water oak (*Q. nigra*), a southern, nearly evergreen tree with variable, rich green leaves, or cork oak (*Q. suber*), a Mediterranean species which produces the cork of commerce. Southern live oak (*Q. virginiana*) and the coast live oak of California (*Q. ag-*

rifolia), two trees with haunting beauty, great character and strong regional associations, are possibilities, too. Give the water oak a moist clay soil, the others a rich, well-drained one.

Raphiolepis indica—India-hawthorn. (2). Attractive leathery-leaved shrub with white-to-pink flowers depending on cultivar (in California there are a number). Long blooming period. This member of the Rose Family from southern China also has persistent blue-black fruit. As an indoor bonsai it is slow growing and brittle to wire.

Rhododendron indicum and other Evergreen Azaleas. (3-2). Can be grown in pure peat moss. Acid soil required. There are a number of excellent cultivars. If I had to choose but one, it would be the shell-pink-flowered 'Coral Bells' (a kurume); Japanese satsukis are choice, too; many others.

Rosmarinus officinalis—Rosemary. (3) See page 47. Keep humidity high in winter and don't overwater.

Serissa foetida and forms. (2-1). See page 39. Tend to pinch instead of wire. Don't overfertilize. The variegated form is a little easier to grow than the others but will become leggy unless light is very good.

Sparmannia africana—African-hemp. (1). Fast-growing shrub with large linden-like leaves that reduce in size with bonsai treatment. It has white flowers with prominent "feather-duster" stamens. There is also a double-flowered form. Shape the plant by frequent pinching.

Syzygium paniculatum (*Eugenia paniculata australis*)—Australian brush-cherry. (1). Slender, dense growing tree sometimes used for hedges in mild climates. New growth reddish. As an indoor bonsai it grows quickly and is easy to shape.

Taxodium distichum—Bald-cypress. (1-3). See page 67. In the home this deciduous southern tree requires a cooler, (Continued on p. 75)

Philip B. Mullan



Serissa foetida in its double-flowered form is also called snow-rose. Its ¼ inch white blossoms and shiny, dark green leaves are reminiscent of a miniature gardenia.

INDOOR BONSAI IN THE NORTH

Sigmund Dreilinger

FOR MANY YEARS I was a frustrated bonsai grower because my traditional bonsai could only be grown outdoors—and for seven to eight months of the year at best. Each November I would put them in their winter quarters where they would remain until March. I would check them from time to time during the winter but no real work could be done until spring. I missed not being with them those four months and looked for ways to extend my involvement throughout the year. That was how my interest in subtropical trees and shrubs for bonsai began.

For years I was told that there are few kinds of plants suitable for indoor bonsai. A skeptic, I began to experiment. I started with what are now some of the most commonly used materials, *Serissa foetida* and the holly-leaved *Malpighia coccigera*. I quickly discovered that just so much can be learned from reading and that there is no substitute for experience. Regardless of the variety of plant or its country of origin, the basic cultural requirements had to be ascertained and met before any success could be realized.

Window Growing With Natural Light

One of the primary requirements of virtually all bonsai is adequate light. Obtaining sufficient illumination in the home can be a problem. The ideal location for the most commonly used bonsai plants is a south-facing window unshaded by trees or buildings. If the grower is unable to provide a southern exposure, the use of artificial lighting should be seriously considered. This will be discussed in greater detail later in this article and on page 35.

Bonsai grown indoors on a windowsill are subject to different temperatures from bonsai grown elsewhere in the house. Regardless of what temperature is maintained in the home, temperatures are always slightly lower in window areas, and this must be taken into account when

growing bonsai there. A lack of storm sash in the winter tends to lower these temperatures still further. Keep track of the variations in different windows and make a conscious effort to maintain the range between 60°F and 85°F. Fluctuations between these two extremes should prove satisfactory for most window-grown bonsai.

In the average home, the dry heat of winter causes great trauma for humidity-loving plants. Bonsai seem to suffer more than most from this lack of moisture in the air. Misting several times a day can help offset the damage done by dry air. In addition, if the bonsai are small enough and very portable, they can be brought into the bathroom when you shower or into the kitchen when you are washing the dishes. Both activities increase the moisture in the air.

Frequency of watering has to be adjusted to the temperature and humidity indoors as well as the growing medium of the bonsai. Outdoors, I use a 50/50 potting mix, by volume, of peat moss and sand. This is a quick-draining mix that, with the frequent addition of a water-soluble fertilizer (one-quarter strength), has worked well. Inside the house, this mix tends to dry out more rapidly and needs more attention. Small and shallow mame containers need watering once a day and occasionally more often. Some of the larger, deeper containers, however, can last forty-eight hours between waterings. Each container really should be checked individually, though, as different kinds of plants absorb water at different rates.

Artificial Lights

In the past twenty years great advances have been made in the lighting industry and a wide range of fluorescent tubes are now available to the homeowner. These innovations have largely done away with



Sigmund Dreilinger

Buttonwood (*Conocarpus erectus*) collected from Florida Keys by author. In training one year.

Sigmund Dreilinger



Satsuki azalea, 7 years old. In training 4 years.

the need for sunny windows. It is now possible to grow many kinds of bonsai, including the most light-loving, in the darkest corners of the house.

Because an even distribution of light is so important, I decided against using commercial fluorescent fixtures that concentrate the tubes in the center. Instead, I purchased 2 two-tubed strip fixtures. They were mounted on 20- x 48-inch exterior plywood panels that had been painted with a white enamel to increase their reflecting properties. The tubes were placed so that the outer ones were 3 inches in from the plywood edge. The inner tubes were in three inches beyond these. This left a 6-inch center area which received light from both sides and was therefore evenly lighted.

Indoors, the house heat plus the heat generated by the fluorescent ballasts raises the air temperature around the bonsai to approximately 75°F when the lights are on. At night, when the lights are off, and depending on the outside temperature, the window is opened to a greater or lesser degree. This serves to cool and ventilate the room so that the temperature drops from fifteen to twenty degrees below the day temperature. If the night temperature falls to 55°F, no harm is done. Those bonsai which are most sensitive to the cold should be placed in another area of the house where higher night temperatures prevail.

The humidity conditions for bonsai grown indoors under lights are somewhat different than for those grown indoors under natural light. In addition to the aforementioned dryness that prevails in most homes throughout the winter, fluorescent ballasts create a slight but additional heat. To combat this, plants must be misted regularly, sometimes as often as twice a day.

Bonsai grown indoors suffer far less from the vagaries of the weather than those grown outdoors. Indoors, watering is done as needed and does not depend on sometimes infrequent rains. Most of my bonsai are placed on pebbles in plastic trays under their lights, partly to retain excess drainage water and partly to cut down on frequency of watering. By plac-

ing water in the plastic trays to a depth of one-quarter inch, I find I can often leave my bonsai for from four to five days. By the third day most of the water will have evaporated from the tray, but it generally takes the soil another two days to dry out sufficiently to require more water.

My subtropical bonsai are put outdoors for the summer and brought in during early autumn before night temperatures drop below 55°F. Then I turn on the artificial lights for twelve hours a day and gradually decrease the length to ten hours by December, which satisfies the rest requirements of most of my plants. In January I begin to increase the duration again, until it is about fourteen hours by April. All lighting is controlled by a time clock. This change in photoperiodism has several interesting effects. Barbados-cherry (*Malpighia glabra*) begins to flower as the light is increased as does the dwarf pomegranate (*Punica granatum nana*) and some azaleas. Many other plants show no apparent response.

The Catlin elm (*Ulmus parvifolia* 'Catlin'), which is of borderline hardiness outdoors in New York, usually undergoes a brief rest period before being brought into the house. It takes approximately one month for this dwarf cultivar to resume growth and it does not start to leaf out well until the light duration is increased. Certain kinds of plants which are not normally thought of as indoor material can be grown under this system with the reduction of the night temperature to 55° F. They include *Juniperus procumbens* 'Nana', Monterey cypress (*Cupressus macrocarpa*) and *Chamaecyparis thyoides* 'Andelyensis'. My giant-sequoia is surviving as are the live and scrub oaks of California. Azaleas and gardenias seem to do well but require a greater amount of humidity.

After thirty years of growing bonsai, I am enjoying them now more than ever. Which species survive under which conditions is one of the more interesting things I am now discovering. Growing bonsai indoors is a continual learning experience—one that is well worth the time and effort.

REPORT FROM THE PACIFIC NORTHWEST

Jane Nelson

IN THE PACIFIC Northwest, particularly the Seattle area, indoor bonsai have not been as popular as in other parts of the United States. Our mild winters, cool summers, pure water and clean air are all factors in the continuing popularity of traditional bonsai. We can view the cool-climate bonsai favored by the Japanese, such as the spruces, pines and maples, through our windows as they sit outdoors on benches all winter. Only a few of them need a cold frame or a covering for a day or two. If one of these bonsai is moved inside for a short time, there are usually few problems because temperatures in the home are seldom more than twenty or twenty-five degrees different from outdoors.

New Favorites

Still, indoor bonsai are grown—by apartment dwellers and people like ourselves who enjoy experimenting with different plants. The small-leaved subtropical evergreens are favored. The most popular is serissa (*S. foetida*), also its variant with yellow leaf margins (*S. f. variegata*). This small shrub from Southeastern Asia is esteemed for its refined small white flowers and tiny foliage. Plants must be kept fairly close to a window for light because our gray winter days encourage legginess. The light intensity in the cold months is not sufficient for the flowering of some kinds of plants and we must occasionally supplement natural light with artificial.

The second most popular indoor bonsai in the Seattle area is the dwarf pomegranate (*Punica granatum nana*), which has narrow, lustrous, not-quite-evergreen leaves, scarlet flowers and reddish-orange fruit. A close third is New Zealand-tea

(*Leptospermum scoparium*). It is a newcomer as a bonsai here but has been widely grown as an outdoor shrub in southern California, where numerous cultivars with single or double, pink to white flowers are available. We usually keep plants in an area with humidity—kitchen, bathroom, or on a saucer of pebbles with water.

Other plants are used, including false-heather (*Cuphea hyssopifolia*), correa (*C. magnifica*) and evergreen elm (*Ulmus parvifolia sempervirens*), which is not a subtropical but can take indoor conditions. Correa has been used successfully in a greenhouse but if treated as a bog plant performs very nicely inside the house in winter. Other people who have grown correa submerge the pots in water about once a month and give surface waterings in-between. One of the dwarf Natal-plums (*Carissa grandiflora* 'Nana Compacta') is used indoors, but its stiffness makes it less popular as a bonsai.

Less commonly mentioned but very successful are a South African succulent called elephant-bush (*Portulacaria afra*) and two myrtles (*Myrtus communis*, *M. ugni*). Their leaves are in good proportion to branch and trunk sizes. *Corokia cotoneaster*, a shrubby member of the Dogwood Family from New Zealand with twisting branches and small yellow star-like flowers, is also used for indoor bonsai, but the room temperature must be on the colder side.

Care and Soil

Fertilizing, pruning and general care of subtropical bonsai are the same as in other parts of the country. If possible, we put our plants outdoors in late May well after the last frost and bring them in again



Arthur Orans

Dwarf pomegranate, informal upright style. One fruit is enough.

in late September before cool weather begins. As elsewhere, gradual acclimation is wise.

For potting, instead of relying on garden soil, which must then be pasteurized in an oven, most people find it easier to buy a pasteurized commercial three-way

mix from a garden center or nursery. To this mix, the contents of which are labeled sandy loam, compost and peat moss, additional sand is incorporated by the bonsai grower. The amount depends on the texture of the mix, for some are looser than others.

Even Bonsai Growers Need a Vacation

BECAUSE bonsai are grown in small containers, they require more frequent watering than many house plants do, and the grower must be ever alert to their needs. But what happens when you want a vacation? Try the "bonsai-sitter bag." It's also an aid for acclimating plants newly purchased from a greenhouse or to nurse recently root-pruned bonsai through a critical period. Here's how it works:

Use a clear plastic bag large enough to envelop the plant and container. Care is essentially the same as for a terrarium. Water the soil well and let it drain thoroughly before placing container in the bag. Make a "bubble" so bag doesn't touch and rot foliage. The bag may have to be opened occasionally to allow excess moisture to evaporate. This works well for about two weeks, and no water will likely have to be added during this time. Open bag gradually over several days to acclimate the plant to drier surroundings. Form wire into hoops and insert into container to make a frame over the plant to support the plastic. —Edmond O. Maulin

*Adapt these ideas from Florida
for indoor use . . .*

NOTES ON GROWING BONSAI IN THE DEEP SOUTH

Winifred Glover and Virginia Harvey

Bougainvillea spp.—Keep plants relatively dry. Use a low-nitrogen fertilizer.

Dwarf Black-olive (*Bucida spinosa*)—Repotting here in Florida is best done in midsummer though possible in February. Use 7-8-4 fertilizer, not a high-nitrogen one that will encourage legginess. If seedlings are collected from the wild, cut the taproot when young.

Kingsville Dwarf Box (*Buxus microphylla* 'Compacta')—In our experience a loose, sandy soil mix is best. Rooted cuttings seem adapted to heat; our parent plant died.

Common Box (*Buxus sempervirens*)—It burns in full sun. Best kept moderately dry. Few pests here.

Dwarf Powder-puff (*Calliandra emarginata*)—Better for bonsai than the non-dwarf species because of smaller leaves and internodes. The spindly trunk is difficult to thicken.

Natal-plum (*Carissa grandiflora*)—Repotting in summer is safer than in spring. Use a deeper-than-usual pot for cool roots. Do not overwater because the old bark will rot. Edible fruit.

Citrus (Calamondin, Meyer lemon, kumquat, etc.) — Spray often for insects.

Dwarf black-olive (*Bucida spinosa*), 20 inches tall, 30 inches wide. Grown in container for 5 years, it requires little pinching to retain good form.



Peter Chvany

Sea-grape (*Coccoloba uvifera*)—Foliage is abnormally large for bonsai. Remove leaves (but not petioles) twice a year to control their size. For alkaline soil.

Buttonwood (*Conocarpus erectus*)—Plants collected from the wild lose their "salt-water" leaves; new ones have a different texture. Pinch back to two leaves.

Strangler Fig (*Ficus aurea*)—Growth slows after potting. Leaf size becomes very much smaller.

Weeping Fig (*Ficus benjamina*)—Don't spray with malathion. Plant will eventually form aerial roots.

Willow-leaved Fig (*Ficus neriifolia regularis*)—Drops leaves with sudden change in temperature but will adapt to air-conditioning if done gradually. Keep fairly dry until leaves return.

Hibiscus ('Snow Queen' and other small-flowered tropical varieties of *H. rosa-sinensis*)—Develops surface roots. Slow growing when established. In our experience plants have lived only seven or eight years.

Junipers (*Juniperus* spp.)—Necessary to spray frequently for mites here.

Upright Lantana (*Lantana camara*)—

This is a weed here, easily gathered by uprooting, defoliating and placing in a paper bag. Watch for fungus infestations. Shape by pruning, not wiring, since branches are brittle.

Barbados-cherry (*Malpighia glabra*)—Must be grown in a large container to thicken trunk. Bears edible fruit if pollinated. Will drop all its leaves and grow new ones.

Cajeput-tree (*Melaleuca quinquenervia*; synonym, *M. leucadendron*)—Stands very hard root and top pruning. New growth will develop along the trunk. The attractive flaking bark of this Australian species has sparked a number of common names, including paperbark-tree, punk-tree and cork-tree.

Jaboticaba (*Myrciaria cauliflora*)—Requires acid soil and part shade. Leaf tips may scorch. Seeds sprout easily but it may take fifteen years before the edible fruit appears. Stewartia-like bark. Needs sun for fruiting.

Slash Pine (*Pinus elliotii*)—This two- or three-needle pine is native here. Cut taproot gradually if it has one. Provide well-drained soil. The needles, rather long for bonsai, are reduced by culture.

Philip B. Mullan



Strawberry-guava (*Psidium cattleianum*), slanting style. Bark becomes smooth with age, reminding a Japanese grower of Saru-suberi, the monkey-sliding tree, better known to westerners as crape-myrtle.

New growth breaks from old wood.
Ebony (*Pithecellobium brevifolium*)—

Growth almost stops when container is too small. Shape it by pruning.

Strawberry Guava (*Psidium cattleianum*)—Especially recommended for its interesting trunk with mottled and peeling bark. Can be raised from seed. It grows rapidly, flowers at a fairly early stage and has edible red fruit.

Dwarf Pomegranate (*Punica granatum nana*)—Avoid wetting flowers if fruit is desired.

Serissa (*Serissa foetida*)—Blossoms well. It's difficult to develop a large trunk. Pinch new growth. Don't overfertilize.

Chinese Box-orange (*Severinia buxifolia*)—Be careful when pruning for shaping because branches are brittle.

Bald-cypress (*Taxodium distichum*)—Collect this well-known deciduous conifer of southern swamps only when it is dormant; prune tops and roots well at this time. In our experience sub-

sequent pruning should be light—and not every year.

Limeberry (*Triphasia triphylla*)—Grows easily from seed or cuttings. Keep plants warm and well watered. A jelly is made from the fruit.

Evergreen Elm (*Ulmus parvifolia sempervirens*)—This variant of the Chinese elm seems to have no problems here. It can be fairly wet or dry, in full sun or light shade.

Bird Grape (*Vitis munsoniana*)—A native grape, easy to collect and grow. It's vigorous, so keep it pinched back.

Final note: To encourage moss we place cheesecloth on the soil around the bonsai. This material eventually disintegrates but in the meantime provides a good environment for moss to appear spontaneously. Also, we like the slow-release fertilizers. The nutrients are made available depending on amount of rainfall or watering.

Bonsai Materials From BBG

IF you are new to the ancient art of bonsai, there are two other Brooklyn Botanic Garden Handbooks to help you. *Bonsai—The Dwarfed Potted Trees of Japan* (No. 13 in our series) is a nitty-gritty introduction with fifteen articles by leading Japanese authorities. As in other BBG Handbooks, the stress is on how-to information that the home grower can put to work. *Bonsai—Special Techniques* (No. 51) elaborates on the essential points of culture, including how to prune and wire, and winter care of plants. Both Handbooks, guest edited by Mr. Kan Yashiroda of Japan, are available for \$1.75 a copy from Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, N.Y. 11225.

There is a 21-minute BBG color film you should know about, too: *Bonsai*, in which the art of training dwarfed potted trees is beautifully depicted. It is available for rental or purchase and is ideal for plant society or garden club programs. Contact Brooklyn Botanic Garden Auxiliary for details. Same address as above.

Having difficulty buying bonsai containers? BBG has a set of seven available by mail for \$8.75, including packing, shipping and sales taxes. They are of glazed ceramic, in different shapes, specially crafted for miniature (mame) bonsai. Six are in soft jade green, the smallest in seal brown. Address orders to the BBG Auxiliary.

Ten very attractive color slides of classical bonsai grown at the Botanic Garden are also available. Price: \$2.50. A color post-card set of fourteen bonsai may be obtained for \$1.50. Address orders to the BBG Auxiliary, too.

INDOOR BONSAI IN SOUTH FLORIDA

Virginia Nichols

INDOOR BONSAI are a great pleasure. Unlike the traditional kinds, they are cared for in the home year round, and the grower lives with them on a day-by-day basis. In time they become almost as much a part of the household as the family.

Air-Conditioned Bonsai

My own collection, which is kept on two tiers of glass shelves in front of a window, is not only an indoor collection but an air-conditioned one as well. Other southern gardeners who live under similar conditions need not be discouraged from growing bonsai for fear of the deleterious effects of air-conditioning. There are many plants that will not only live but thrive in this environment.

Because my apartment is centrally air-conditioned twenty-four hours a day, the windows are never opened. The window on which the bonsai are grouped faces west and is in a direct line with the air-conditioning duct 15 feet away. This is a safe distance; if any closer, difficulties may be encountered. My bonsai, which number between thirty and thirty-five, have survived nearly two-and-a-half years in this environment. The few that have succumbed in the interim have died from overwatering, incorrect soil mixes, spider mites and insufficient root systems. None died as a result of being indoors or from exposure to air-conditioning.

Heat and Water

Temperature in the window area, especially in southern climates where hot, sunny weather predominates, must be kept from becoming too high. Morning temperatures are usually no problem. In late afternoon, however, when the sun is at its strongest in my bonsai window, I simply draw a sheer drape across the window. This alleviates the intense heat

and seems to prevent burning. A small thermometer sits on one shelf and the readings are surprisingly constant, rarely dipping below 73° or above 76°. On the rare occasions in winter when it turns cold enough for the heat to go on, I change nothing except to check more often to see if additional watering or misting is needed.

Watering indoor bonsai is no more difficult than watering outdoor bonsai. As a matter of fact, indoor bonsai require far less. Because of their protected location they are not exposed to the drying effects of direct sun and wind. Larger bonsai will benefit from being outdoors during *gentle* rains, but smaller ones that might blow over are best left indoors and misted instead.

My bonsai are watered nearly every morning with either purified water or tap water that has stood at room temperature for a day or two. An old detergent squeeze bottle serves well in lieu of a watering can, for I can regulate the amount of water better. A friend of mine likes to occasionally submerge her containers in water to just above the soil line. The bonsai remain under water until bubbles cease ascending. If this method is used, most bonsai, depending upon size, can go several days without water if not sensitive to low aeration in the soil.

My bonsai are watered lightly again before dusk. I first mist the soil surface—one quick spray on the name and several more squirts on the rest. Each shelf-ful then gets its foliage misted briefly. Watering the plants in the home has the added advantage of being more gentle on the soil. Letting the rain water take care of outdoor plants is more apt to be violent in Florida because frequent downpours can disturb the soil and stain the pots. I fertilize actively growing plants once every three weeks, in the morning, applying a water-soluble fertilizer at half strength.



Philip B. Mullan

Parsley-aralia (*Polyscias fruticosa* 'Elegans'), 12 years old, 5 years in training.

Favored Plants

Throughout this Handbook there are recommendations for plant material suitable for indoor bonsai. The following suggestions are based on plants that have done well for me in Florida. *Ficus* (particularly *F. neriifolia regularis*) are exceptional, as is Norfolk Island-pine (*Araucaria heterophylla*; synonym, *A. excelsa*). The very pretty *Malpighia punicifolia* performs just as nicely indoors as it did for four years outside, and holly-leaved malpighia (*M. coccigera*) seems to flourish. Bougainvillea is excellent although its green coloring is not as dark as it should be. With the addition of trace elements, it may green up. One of my most interesting indoor bonsai is a *Polyscias*. Though not liked by all bonsai enthusiasts, it has proved most satisfactory for me. It requires comparatively little water, is not much affected by pests, stays green and healthy and can be styled to fit almost any spot. In addition, there are many varieties available to choose from.

A friend and I are both trying our luck indoors with sea-grape (*Coccoloba uvifera*). Mine is only 3¼ inches tall and has about thirteen leaves, the largest of which

is 1¼ inches in diameter. This is an excellent leaf size for a potential bonsai. In the garden the leaves of this bold foliage plant are generally as much as 8 inches across. The fact that they do become small with bonsai culture is heartening. Thus far, our sea-grapes are only about ten months old so it's still too early to tell how they'll do as bonsai. At this point, however, both look good. Mistletoe fig (*Ficus diversifolia*) has always proven reliable for me as has the powder-puff (*Calliandra haematocephala*).

One bonsai which did very poorly indoors was a very small-leaved form of the Chinese elm, *Ulmus parvifolia* 'Catlin'. It was just a rooted cutting when brought into the home. I put it in a bonsai container much larger than needed, giving it sufficient room to grow. In two years time, during which it was repotted once, the Catlin elm failed to grow a single additional leaf. Three months ago I put it outdoors again, where it is once again thriving. In three months time I had to trim it twice!

Decorative Elements

Indoor bonsai have advantages over outdoor bonsai as decorative elements in the

home. One of mine sits in the center of a large round coffee-table in the den. It is flanked by a bronze statue of Diana and always looks pleasing. An 18-inch-tall ficus, it gets a small amount of water daily under my conditions of a cool air-conditioned room. Too much sun is not a problem as the table is about 12 feet from the window. Family and friends spend a great deal of time in this room and we all derive quiet pleasure from the bonsai's presence.

No matter where you choose to keep your bonsai indoors, one should always grace the dining-room table. I have an ixora on mine, and although there is a definite front and back, it seems to look right from most any angle. It is not very tall and usually has a few tiny bright red blossoms on display. It gives me special pleasure to use this as a centerpiece when

I entertain and it seems to be a great conversation piece among my guests.

Indoor bonsai are finally catching on and nothing could be a more welcome trend. In the South, they require little care and are constant sources of pleasure. Because most southern bonsai are subtropicals, they require a great deal of light, but this is easily arranged in Florida. Most homes here are built with large windows, sliding glass doors and white walls—all light enhancers.

I began by saying that indoor bonsai are a great pleasure and I hope you have become convinced. Why not try it yourself? You may lose some along the way, but experimentation is part of the fun. You'll soon find plants that will thrive in your conditions. When that happens you'll begin to enjoy the fruits of your labors and the admiration of your friends.

Malpighia puniceifolia planted over rock displays natural root growth. Tree is about 9 inches tall.

Peter Chvany



INDOOR BONSAI IN HAWAII

David Fukumoto

BONSAI are grown mainly outdoors year round in Hawaii. However, indoor bonsai are becoming increasingly popular as yards get smaller and more people move to townhouses and apartments. With the exception of dry heated air, we face the same problems of inadequate light, cultural adaptations and acclimation that growers do in other parts of the United States. In general, more glass is used in typical Hawaiian structures, but there is a movement toward artificial supplementary lighting when necessary or for superior growth.

Indoor bonsai vary from simple attempts of tropical foliage plants in a bonsai pot to advanced bonsai designs. Initial attempts with common and durable house plants such as schefflera (*Brassia*), pachira and polyseias are usually successful and pave the way toward more challenging plants. Because of larger leaves and non-woody trunks, they are often passed over for bonsai. However, bonsai techniques will produce striking designs and provide easy-care indoor showpieces.

The Old Trees

A bonsai grower with a little experience uses tropical plants that have woody trunks. The major plants in this category are Chinese banyan (*Ficus retusa*) and weeping fig (*F. benjamina*). Although they are related, growth and training vary considerably. Whereas weeping fig must

be propagated from cuttings, Chinese banyan has fertile seeds and volunteer seedlings can be collected from rocks, walls, rain gutters, sidewalk cracks and on host trees. There are many fine mature trees of Chinese banyan with amazing aerial root systems here. Even weeping fig will form aerial roots under heavy leaf canopy and high humidity.

With or without aerial roots, the *Ficus* species have impressive shapes. A *Ficus elastica* planted in Hilo in the 1870's has formed a multi-trunked tree with a lofty crown and huge buttressing roots. With maturity the leaf size has been naturally reduced to only a few inches and upon seeing the tree for the first time it's unthinkable that it's the same as the popular indoor "rubber tree." The massive form of this and many other large ficus trees in Hawaii serves as inspiration for tropical bonsai.

Fuku Bonsai



Australian brush-cherry (*Syzygium paniculatum*, but often sold as *Eugenia myrtifolia*) is a good beginner's bonsai. This plant is 15 inches tall.



Fuku-Bonsai

Collected plant of Chinese banyan (*Ficus retusa*) being trained on lava rock. It displays aerial roots typical of mature trees of this type.

Light Factors and Styling

Some plants acclimate well to indoors directly from full sun, but most will benefit by an intermediate period in shade. Plants should not be growing vigorously and should be leached of fertilizer by soaking, flushing or scraping the salts off the pot rim before coming indoors. Plants grow in relationship to their light availability; and since indoor light in Hawaii is often one tenth or less of outdoors, fertilizing and watering needs are less also. Good drainage, moisture and watering practices are more important indoors. Because the indoor bonsai are getting attention more often, initial attempts usually fail by killing them with kindness.

Styling of indoor bonsai tends to be more subtle and not as dramatic as the traditional evergreen bonsai. In finding design inspiration from the mature tropical trees we find a preponderance of heavy rounded crowns and arching branches rather than the traditional tier-branching. Exposed roots are often more dramatic and barks more varied. A number of warm-climate plants have flowers that bloom throughout the year.

In selecting plants for indoor bonsai consideration should be given to differences in plant growth under indoor and outdoor growing conditions. In Hawaii the two most popular outdoor bonsai plants are the Japanese black pine (*Pinus thunbergii*) and Australian-ironwood (*Casuarina* spp.). Both are highly variable when grown from seed. Both tend to become spindly when shade grown indoors, and an extraordinary amount of ar-

Most warm-climate trees have large leaves but if their foliage is removed two to four times per year, leaf size is reduced drastically. Remove by stripping, except for the Sea-grape, which must be cut in a manner that leaves the petioles attached. Smaller-leaved trees available for indoor bonsai include citrus, eugenia, jaboticaba, melaleuca, olive, podocarpus and pomegranate. Shrubs include bougainvillea, carissa, lantana, malpighia and serissa. In almost every advanced collection others are being tried that would be suitable for indoor bonsai.

Although mild-climate plants are mentioned above, the possibilities for indoor bonsai include a few kinds from cooler areas. Initial trials indicate that pyracantha, evergreen azaleas, cryptomeria, cupressus and chamaecyparis will do well indoors. Plants that elongate and become spindly in semi-shade are ruled out.

tificial light is needed to supplement even the brightest light indoors if they are to perform well.

Experiments

We do many trials to select outstanding candidates for indoor bonsai that are smaller-leaved and naturally compact. With highly variable species many variants are tested; and if one clone proves to be superior, other trial plants are discarded and the superior clone propagated asexually by cuttings. Occasionally, a branch mutation appears with dwarf leaves and compact branches. This is air-layered and serves as a stock plant. Sometimes plants propagated from cuttings are superior to plants grown from seed. In other cases the reverse is true.

Over the years that traditional bonsai has developed in the Orient, many of the plants most popular and suitable have

been propagated and introduced to their bonsai community in this painstaking manner.

Indoor bonsai is very much in the pioneering stage, but the active search and discovery of outstanding and suitable plants have progressed well. Whereas traditional bonsai developed in the Orient under very secretive conditions, indoor bonsai is progressing rapidly because of plants of faster growth and cooperation between growers in all parts of the country. Nursery certification programs are lowering plant distribution barriers that once made plant movement difficult between states. New techniques and available aids make re-establishment of plant stock less of a gamble even when a plant has been bare-rooted and fumigated. New methods of packing and use of air services get plants to destinations in prime condition. All of this hastens the day

Indoor bonsai in training in Hawaii. From left: schefflera, serissa, dwarf azalea, schefflera, golden Sawara false-cypress (*Chamaecyparis pisifera* 'Aurea'). The tallest is 10 inches.



Fuku-Bonsai

when superior plant material will become available to anyone interested in indoor bonsai.

Once plants are selected and indoor cultural procedures are learned, there is little difference between indoor and outdoor bonsai. At first miniature bonsai were difficult, as we tended to overwater them. Now complete assembled miniature landscapes do well indoors. Rock plantings are easier indoors because they drain well and don't dry out so quickly.

Smaller bonsai benefit from easily improvised supplemental artificial light. Larger bonsai require more elaborate lighting arrangements.

We're fortunate in Hawaii to have a store of basic bonsai knowledge, suitable plant material and an even and mild climate. With these basic advantages, both indoor and outdoor bonsai have increasingly brought joy and fulfillment to those who take up this fascinating pastime.

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AN INVITATION TO JOIN AND ENJOY

*A man does not plant a tree for himself;
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—Alexander Smith

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100 Plants From A to Z,

(Cont. from p. 59).

drier winter than summer to lose its leaves. During the surge of new growth in spring, give plant plenty of water.

Trachelospermum jasminoides—Confederate-jasmine, Star-jasmine. (1). Be sure to pinch the strong-vining new growth of this twining shrub from the Himalayas. The white flowers are deliciously fragrant and the leathery foliage is always attractive.

Ulmus parvifolia sempervirens—Evergreen Elm. (1). See page 67. Excellent for very small or shallow containers.

Wisteria spp. (4). For the keen bonsai enthusiast, this well-known vine is a challenge in the home. It's worth the extra effort to produce the bloom. Excellent light is needed, plus careful pruning.

Xylosma bahamensis. (1-3). Caribbean tree with silver-gray bark and very graceful, feathery leaves. It's fast growing—watch for wire cuts. Responds well to pruning.

Zizyphus jujuba—Jujube, Chinese-date. (2-3). Small tree with dense lustrous foliage. Hardy in the North but grown mostly in mild climates. Tolerant of alkaline soil. The small light-brown edible fruits are not very ornamental in the garden but have a certain charm when jujube is grown as a bonsai.

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An elegant example of *Serissa foetida* in white, double-flowered form. See page 59 for a close-up of the blooms.

Philip B. Mullan

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AMONG OUR CONTRIBUTORS

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- BENJAMIN BLACKBURN, Gladstone, New Jersey, Emeritus Professor of Botany, Drew University, Madison, N. J. Author of *Trees and Shrubs in Eastern North America* (Oxford University Press, New York). A member of the International Dendrology Society, he is a keen student of woody plant taxonomy.
- L. C. CHADWICK, Emeritus Professor of Horticulture, Ohio State University, Columbus, has many devoted former students around the country. One of them is Edmond Moulin, B.B.G. Horticulturist. Among his awards Dr. Chadwick has received the Liberty Hyde Bailey Medal of the A.H.S.
- ALAN D. COOK, Horticulturist, Dawes Arboretum, Newark, Ohio, helps produce one of the liveliest and most informative newsletters issued by an arboretum anywhere. A former nurseryman, he is well known for his column in *News & Views* (American Horticultural Society).
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- R. A. KEEN, Professor of Ornamental Horticulture, Kansas State University, Manhattan, has broad interests, among them being lawn care and the yews (*Taxus*).
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- ANN REILLY, Massapequa Park, New York, is with Martin Viette Nursery, Muttontown. She has served several horticultural organizations in a public relations capacity. Her special fondness is for roses. Past B.B.G. staff member.
- ELIZABETH SCHOLTZ, Director, Brooklyn Botanic Garden, has varied interests that stem partly from her background in South Africa. Among them are dye plants, herbs, succulents and bonsai. She was in charge of the B.B.G. adult instruction program from 1961 to 1971.
- ROBERT G. TITUS, Assistant Director, Planting Fields Arboretum, Oyster Bay, New York, is a student of trees and shrubs. He is immediately responsible for the care of the collections at this Long Island showcase of plants.
- RICHARD G. WALTER, New Vernon, New Jersey, has brought the state of vegetable growing to a high art in recent years. Salsify is a favorite, and he grows corn salad nearly all winter. Former Shade Tree Commissioner, Maplewood.
- JOHN C. WISTER, Swarthmore, Pennsylvania, one of the leading spirits of American horticulture in the 20th century. Recipient of the Liberty Hyde Bailey Medal of the A.H.S. For more, see page 9.

BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

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Staff for this issue:

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The Elizabethan Knot Garden in the B.B.G. Herb Garden is a popular feature for visitors. It is composed of miniature hedges of germander, gray and green santolina and variegated thyme. None is taller than 8 inches.

LETTER FROM THE BROOKLYN BOTANIC GARDEN

It's Winter Issue time again, and most readers will recall that the format consists in part of a digest of leading horticultural articles that have appeared in other publications in the previous year. Let us take this opportunity to thank our Contributors and sister periodicals who have made this 128th issue of P & G possible.

We note with warm pleasure that three of our Contributors, Drs. Avery, Chadwick and Wister, are recipients of the esteemed Liberty Hyde Bailey award which is conferred annually by the American Horticultural Society. Younger readers, alas, may wonder just who was old "Free Skin" (an affectionate name given him by irreverent students of the Cornell dean). Few people today will recall that Bailey was almost pressed into running for the governorship of New York about the same time another university professor, Woodrow Wilson, made a successful try for the same post in New Jersey; or that he wrote a little treatise on democracy which was used in political science courses until the 1950's. More to be remembered perhaps is that he was a pioneer in the country's agricultural extension system and molded it in his early years to serve both farmers and gardeners.

Bailey's lasting achievements were his horticultural works, which became legendary. He was one of America's most prolific writers and editors (over 67 books, including several encyclopedias). A significant publishing event of the past year was *Hortus Third*, the complete revision of his "concise dictionary of gardening and horticulture." That is, "concise" in the same way that *Remembrance of Things Past* concisely depicts the human condition. It is a hefty, expensive tome and represents many years of hard work by the staff of the Bailey Hortorium. See page 54 for a review.

Bailey once wrote, "Man has dominion, he has no commission to devastate." This leads us to mention endangered species of plants, which sometimes make the news these days, especially if they have a name like Furbish lousewort. Species on the wane usually don't have vernacular names because most of them haven't been well known at all, but this lousewort or wood-betony (a term we prefer) commemorating 19th-century artist Kate Furbish, has caught the imagination of the press. A couple hundred of these plants are growing along the Upper St. John River in Maine and constitute the only U.S. locale of this species, known botanically as *Pedicularis furbishiae*.

All fine and well. Now enter the Army Corps of Engineers, an organization which hasn't won many laurel wreaths from naturalists. It wants to build a \$600 million hydroelectric dam in the area. Furbish lousewort is going to be on the Government's endangered species list, so plans for the dam will probably be cancelled. Seldom has the demarcation line between builders and conservationists been so graphically depicted.

With this issue Margaret Joyner becomes Associate Editor of Plants & Gardens, succeeding Marjorie Dietz, who served in this position for the past eight years. We would like to thank Mrs. Dietz for her many contributions on behalf of the publication and wish both her and Miss Joyner all the best. Miss Joyner has lately devoted her attention to revisions of several older Handbooks in the series, including *American Gardens—A Traveler's Guide*. Incidentally, copies of this updated compendium are available from the Botanic Garden for \$1.75.

Winter turns to spring and a new gardening year, with renewed faith and hope, is upon us. Wherever you live, if you are planning a visit to New York, please consider this a warm invitation to spend some time with us at the Brooklyn Botanic Garden in this year of anniversary gardens within our larger framework.

—And good gardening in 1977.

Sincerely,

Frederick McGourty, Jr.

Editor

A BROADER HORIZON FOR WESTERN GARDENS

George S. Avery

Adapted from *THE AVANT GARDENER*, March 15, 1976 (Vol. 8, No. 11)

A tragic admission though it may be, I suspect we owe it to ourselves to make it: relatively few gardens of our Western world have acquired a dimension greater than the visual pleasure they give us in the viewing. They have a certain beauty, yes, but the flashes of color and continuing bloom we so eagerly strive for must not be the sole measure of garden quality. It is by our horticultural selectiveness that we have probably achieved our greatest distinction as a nation of garden lovers, for we have chosen many of the world's finest species and varieties of plants to grow in our gardens.

Students of the garden arts are discovering in Japanese gardens a dimension that is likely to have a deeper influence on the future of American gardens than we can now foresee. It is a philosophical dimension, and its rich and deeper meaning awaits all who seek more than the sprightliness of color, more than "good design" and more than collections of unusual plants.

Western Gardens

Let us first see what we have in our own land, remembering that Europe is our chief cultural background. The bare bones of our garden thinking might be summarized about like this:

1. Seasonal gardens, emphasis on color—spring, with bulbs for earliest bloom, then flowering shrubs and trees; summer, bed and border plantings, chiefly choices of flowers that will provide continuing bloom into autumn.

2. Ecological concepts—rock gardens, planted with alpine species and depen-

dent on appropriate use of rocks for ecological authenticity . . . water or water-enhanced gardens: usually small lily pools; some with enticing little brooks and waterfalls (often as part of a rock garden) . . . wooded groves, naturalistic woodland gardens with shade-tolerant wildflowers.

3. Styles, ranging from non-stylized border plantings to formal geometric patterns, terraces, sunken, etc., depending on the size and topography of the home property.

4. Special collections—herb gardens (ornamental, utilitarian, or both) . . . single genus gardens (rose, iris, azalea, etc.) . . . arboretums, restricted chiefly to trees and shrubs in their many species and varietal forms (weeping, dwarf, etc.).

5. Accessories—bird baths, sundials, stepping stones, fences, benches, walks and sometimes indiscriminate whimsical or other objects. So much for American gardens.

The Japanese Concept

With this summary make-up of the gardens most familiar to us, now turn to the gardens of Japan. Although derived in part from those of medieval China, they are refined and stylized and have gained a spiritual touch as well as a more sophisticated and subtle representation of nature. They are "intended to break the connection with the outside world, so to speak, and produce a fresh sensation conducive to full enjoyment of aestheticism in nature," writes Takuma Tono.

Thus one philosophical concept of an ideal Japanese garden is that it should be



Philip B. Mullan

The Roji Garden, one of several Japanese-style gardens in the B.B.G. framework, connects the Ryoanji and Tallman Dwarf Gardens. It is a study of various leaf textures and shades of green. Liriope, pieris, Japanese holly, evergreen azaleas, false-cypress and dwarf pines rise from a cover of moss which is kept moist by a mist system.

a retreat for leisure hours, a concept not unlike our own, but on a somewhat different level of appreciation. Such phrases as "in quiet taste", "the effect of tranquility" and "complexity with simplicity" add enchantment for Occidental minds, as does the added dimension of symbolism.

The symbolism that links spiritual thinking with earthly things, in the minds of the Japanese, derives from the Shinto religion. This basically simple nature worship long preceded Buddhism in Japan. Anything that was the object of reverence and respect, be it heavenly or earthly, animate or inanimate, was a deity (kami). Thus a pine tree or other evergreen becomes a symbol of long life, in a sense, of eternity. Bamboo is a symbol of strength (proved beyond question to Tokyo visitors when they see bamboo

poles used for scaffolding up to 10 stories or more of a building under construction). Humbler than bamboo are the plum blossoms, symbols of bravery because they are the earliest flowers of Japan to open in the yet-cool days of spring. The waterfall symbolizes life itself, ever falling, ever renewing. And rocks, most fundamental of nature's objects, are the bones of the earth—a view first held by people of the old China.

Bear in mind that flowers are rarely used in Japanese gardens. Not that the Japanese do not love flowers. They do, but they use them with restraint in creating garden landscapes. A blossom is an ephemeral thing, its life too short to give enduring qualities to the garden scene (flowers for cutting are grown in nursery gardens). Evergreen shrubs and trees are prized for their year-round contribution



The most famous of the Zen philosophy gardens is the 500-year-old stone garden of the Ryoanji Temple (Temple of the Tranquil Dragon) in Kyoto, Japan. This replica is at the Brooklyn Botanic Garden.

to the strength of the landscape. Thus Japan's gardens are essentially monochrome.

Here lies the essence of Japanese garden thought: rocks, water and plants as representative of nature, put together as pictorial representations of various aspects of nature in such a way that they bring perfection to the picture created, giving it a special message for the viewer. Above and beyond the visual experience, the objectives are to stimulate contemplation and meditation, joining the essence of nature with everyday living.

Japanese Styles

The important artistic contribution of Japanese gardens is balanced asymmetry. These are the styles:

1. Condensed landscapes and often "borrowed scenery." Typical example: hill and pond gardens, inspired by the boating and strolling gardens of medieval China.

2. Flat gardens—Zen Buddhist inspired; rocks and sand, such as the Ryoanji Temple Stone Garden, or simply free-form asymmetrical beds of moss in a field of sand.

3. Accessories—bridges, water basins, small shrines, lanterns, stepping stones, enclosing fences and gates.

"There should be gardens for all classes and all minds," write Newsome and Shigemori. "few . . . express more than one idea." Another philosophical concept, expressed by Teiji Ito: "Western gardens represent an ambition attained, nature subdued." They are "an illustration of the humanist ideal: man is the measure of all things. The Eastern garden and its assumptions are quite different. Man finally and firmly becomes part of Nature itself. There is no assumption that there is something better than Nature." Thus in the Japanese garden it is Nature which does the creating, not the gardener.

Further Readings

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Japanese Gardens, "Sunset Magazine" Editorial Staff (Lane Books, Menlo Park, California, 1968).
Japanese Gardens and Miniature Landscapes, Handbook 37, Brooklyn



Philip B. Mullan

Corner of Roji Garden with stone lantern, water basin, and bamboo water pipe and dipper. In Japanese gardens the dipper is used to cleanse the hands before visiting.

The classic Japanese hill-and-pond garden has a special appeal for Westerners. The first such garden was constructed in China more than 1,000 years ago as a "boating and strolling garden," but it remained for the Japanese to reduce its size, to simplify its form and to give it refinement. This scene is in the Japanese garden at Brooklyn Botanic Garden.

Brooklyn Botanic Garden





Brooklyn Botanic Garden

The charm of a Japanese garden may lie in its *Torii* (gateway to Heaven), diminutive hills, its pond, in-flowing stream with rocky cascades, its tiny island connected with the "mainland" by a drum bridge, its artfully placed rocks, "cloud" pruned trees and similar features. Scene: Brooklyn Botanic Garden.

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Japanese Stone Gardens, How to Make and Enjoy Them, Kazuhiko Fukuda (Charles E. Tuttle Co., Rutland, Vermont, 1971).

Landscape Gardening in Japan, Josiah

Conder (Dover Publications, New York, N.Y., 1964)—reprint of 1893 classic.

Oriental Gardens in America, A Visitor's Guide, Dorothy Loa McFadden (Douglas-West Publishers, 7046 Hollywood Boulevard, Los Angeles, California, 1976).

The World of the Japanese Garden, Loraine Kuck (Water/Weatherhill, New York, N.Y., 1968)—probably the most comprehensive in text and pictures of all the works in English. ❧

AN INTERVIEW WITH JOHN WISTER

About a year ago a B.B.G. staff member was sitting next to Donald Wyman, the noted Horticulturist Emeritus of the Arnold Arboretum, who was just then being introduced to the students in a Botanic Garden classroom. The speaker recounted Dr. Wyman's prolific contributions to the national gardening community, mentioned his various books and articles, and referred to him as the Dean of American Horticulture. Wyman, a modest and unassuming man, became flushed and, turning to his neighbor, whispered, "Good grief, no! That's John Wister!" It tells something about both men.

In his long career John Wister has received virtually every major award that the horticultural community in the United States can bestow, including the Liberty Hyde Bailey Medal. For many years he served with distinction as Director of the Arthur Hoyt Scott Horticultural Foundation at Pennsylvania's Swarthmore College, one of America's most beautiful campuses, as well as Director of the Tyler Arboretum in nearby Lima. He has been a formal and informal consultant to botanic gardens and arboreta, as well as an author and editor. Dr. Wister was also a driving force in the establishment of some of the country's well known plant societies. On his 90th birthday the Brooklyn Botanic Garden salutes him with a bouquet of lilacs, one of his favorite flowers.



Dr. Wister, how did your interest in plants begin?

I grew up in Germantown, a Philadelphia suburb, and there didn't seem to be many children to play with in those days. That was in the 1890's. My mother had a gardener and I followed him around as he was doing his chores. By the age of ten, I discovered how to make cuttings. The first were of *ageratum*s. I had wonderful results with them. That was about 1898. It takes a full week to root them well, I learned. I had good luck rooting *nasturtium*s too, but many of the fine old named varieties have disappeared from the trade.

Did nasturtiums get aphids then the way they do now?

No, nothing seemed to happen to them. Of course, everything was perfect in those days!

What do you remember about other plants?

There were lilacs everywhere. Fragrant ones, too. That doesn't count for much among the modern breeders. I always recall the lovely scent of the old *heliotropes*. What a shock it was some years later, in the 1920's I think, getting a so-called improved, large-flowered variety from Lemoine in France, one of Europe's great nurseries, and discovering it had no fragrance.

Are there plant fashions?

Yes. When I was a young man, everyone seemed to have circular beds of 6-foot tall cannas edged with scarlet sage and yellow coleus. Eventually they became clichés and lost favor. I have a residual fondness for them; nostalgia, I guess. Today horticulturists such as Dr. Robert Armstrong at Longwood Gardens are breeding smaller cannas and they may become popular again. The peegee hydrangea (*H. paniculata* 'Grandiflora') was tremendously overplanted at one time, too, and people gradually lost interest in it. I suppose it was a good enough shrub. Plants come and go.

Have there been many many changes in the native flora?

Even the Philadelphia suburbs were

sparsely settled in the 1890's, though they were one of the oldest such areas in the country. There were lovely fields and woods, and these, along with many of the plants that grew in them, have gone. I remember the American chestnut as the dominant tree. Then the blight came. It made a frightful mess when they died and kept falling down. New England is going through the same thing with the American elm now. Not all the chestnuts died, though. At the Tyler Arboretum we see 15- or 20-foot tall sprouts from old stumps.

Wasn't Philadelphia one of the cradles of American horticulture?

Yes, along with Boston and Long Island. Of course, Philadelphia had a plant tradition inspired by John and William Bartram. Then, the Pennsylvania Horticultural Society was founded in 1827—and Massachusetts started its own a couple of years later. They have had their ups and downs over the years. Our society was started by people who had little suburban places and went to town every day to work and then came back home to putter around in the garden. Maybe they had a handyman to help them but they knew the plants. There were many well known nurseries in the Philadelphia area, too. One of them as the century progressed was Meehan's. I never knew Thomas Meehan, the original owner, but remember as a boy reading his gardening magazine, *Meehan's Monthly*. It wasn't fancy but had a lot of solid information in it. We need more publications like that today. They have almost disappeared.

What happened to gardening as the 19th-century developed?

Well, of course, the country grew and some people built larger homes and gardens. Estate gardeners were brought over in numbers from England to manage them. These highly trained gardeners brought about their own flowering of America. There were crazes. In the 1880's and '90's everyone was growing chrysanthemums. I particularly recall the pompon types, those lovely little buttons of my childhood. They stood the weather and flowered from mid-October to mid-

November in Philadelphia. Some of them lasted to Thanksgiving. We don't see them much in gardens anymore. The catalogs today are promoting spider mums and other fancy sorts.

I used to go up to Meehan's in Germantown in October. They would have a huge variety of chrysanthemums finishing their bloom in 6-inch pots. I would take a few home each year and grow them in our greenhouse and make cuttings. At one time I had 100 varieties.

Was there a rhododendron craze?

These plants have only become popular in recent years because breeding and selection have resulted in extraordinary new varieties that are adapted to our climate. There are a great many hardy plants we have now that didn't exist a hundred years ago. However, there was a sudden surge of interest in rhododendrons as a result of the American Centennial held in Philadelphia in 1876. A big group of them was brought over from Waterer's Nursery, then one of England's leading firms. They were planted around Philadelphia and, I guess, Long Island and Baltimore. People lost many of these imported plants, just as they lost so many other British things that were not suited for our growing conditions. One of the hardest gardening lessons this country has had to learn is not to follow England too closely. Many plants that thrive there simply won't do here.

We owe the beginning of modern rhododendron breeding to Charles Dexter, Joseph Gable and Guy Nearing in the 1920's. Mr. Dexter did it on a larger scale than anyone but kept no records so we don't know exactly what he had. In fact selection of some of his rhododendrons is still going on by Heman Howard at Heritage Plantation, the old Dexter estate in Sandwich, Massachusetts. We have also been doing this at Swarthmore, where there are some late-flowering hybrids we think highly of. They are mostly hybrids of *Rhododendron maximum* and *R. discolor* blooming in the latter part of June after most rhododendrons have passed. This is very important to the hobbyist, if not to the professional grower. Nurseryman Paul Vossberg once remarked that

rhododendrons were dead commercially after May 15, the average gardener being interested only in early spring color from them. We will see if that is still true.

What are some of the changes in gardens of the 20th century?

The great old estate gardens began to disappear after World War I. The Second World War did nearly all of them in. Now we have smaller gardens again. There are some very skilled gardeners in organizations like the Garden Club of America, the National Council of State Garden Clubs and the Men's Garden Club of America. People also have specific interests nowadays. Over 500 members attended the Rock Garden Society meeting in Seattle this past summer. I imagine they must have been climbing every mountain in the State of Washington. About the same number attended the American Rhododendron Society meeting here last year, too. This never used to happen. It's wonderful.

The plant societies have been doing fine things. Quite a few of them are around these days. The American Rose Society was one of the first, then the Peony, Iris and Daffodil Societies. There is even a Hosta Society now, and it is very active. Hostas are splendid plants for shady sites and some of them, notably *H. plantaginea*, have a great deal of fragrance. They are just coming into their own in the garden and I expect that the breeding of them has just begun.

How many plant societies did you start?

I didn't start any. I *helped* start the American Iris Society in 1920 with a group of wonderful people and the backing of Dr. C. Stuart Gager, who was Director of the Brooklyn Botanic Garden at the time (and in fact for 32 years), and Dr. Nathaniel T. Britton, the Director of the New York Botanical Garden.

I was at the early meetings of a number of other societies. Paul Frese supported one for the daffodils and made it possible by his publicity. There was also the American Association of Botanical Gardens and Arboreta, which held its first meeting in Cleveland in 1940. Dr. Gager presided over it and Robert Pyle was the

moving force behind it. I missed the first meeting of the International Lilac Society but was certainly there in spirit.

What role do you see for the plant societies today?

Well, of course, I always give people a lot of good advice but they don't necessarily follow it! In a more serious vein, though, it seems to me that some of the societies ought to be setting up ways to distribute new varieties (apart from seed) to their members, much as the New York State Breeding Program at Geneva does with apples and other fruits. Good plants are always hard to get, particularly the new ones. Fewer and fewer large nurseries are bothering with them.

Haven't some societies already done this?

Yes, indirectly. Many hobby businesses have started as a result of the stimulation of societies. Some of them ship plants, others have only a local or regional trade. If you are a collector you don't go to a large general nursery for *hemerocallis*, iris, daffodils, hostas or lilacs. Such firms offer just a few varieties and usually not the best. You go to the specialists if you want something choice. For example, nearly all of the rhododendron nurseries on the West Coast started as hobbies growing out of the owners' involvement with the American Rhododendron Society.

*You are interested in *hemerocallis*, too?*

Of course, especially the fragrant ones. I like to grow the old-time lemon day-lily, which we called *Hemerocallis flava* and the authorities now refer to as *H. lilioasphodelus*. It blooms in May and has a delicious scent. You don't find it much in gardens anymore. A later-blooming one that is fragrant is 'Lemon Lustre'. Still later is 'Fond Farewell'. I've been busy dividing this last one so there will be a good colony of it to provide fragrance in my garden toward the end of the season. There are many beautiful new day-lilies today and the Hemerocallis Society is a very active one.

You knew virtually all of the leaders of American horticulture in this century.

Would you mind giving us a few impressions?

All were wonderful people, some a little more open than others. I remember when Liberty Hyde Bailey was invited to Swarthmore College. This was in 1930, when the Arthur Hoyt Scott Foundation was started at Swarthmore, and I was its first Director. Mr. Charles Jenkins, President of the College's Board of Managers (and a keen collector of hemlocks), and I showed Dean Bailey the campus and we all drove over to Lima to see the Tyler plantings. The unpaved road was slippery and the car stalled on a hill. Bailey, who was in his 70's, and I got out to push—and we both were frightfully splattered with mud.

When he left he asked if there was anything he could do for us. I hastily replied, "Yes, could you give me an introduction to the Superintendent of Parks in Rochester, New York?" I wanted to get cuttings from some of the lilacs in the great collection at Rochester's Highland Park! He was my dear friend ever after.

Did you know Charles Sprague Sargent?

Yes, he was Founding Director of the Arnold Arboretum in Jamaica Plain, Massachusetts. As a student at Harvard, I used to often visit the Arboretum, and he gave me written permission to take some seeds and cuttings. He had a reputation for gruffness, even throwing out reporters, but he was kind to me.

E. H. "Chinese" Wilson, the plant explorer, was then Horticulturist at the Arnold, and I vividly recall the superb flower shows he helped put on in Boston. At one of them, in 1913, there were huge tubs of climbing roses 6 or 7 feet tall in bloom. Alfred Rehder, author of the *Manual of Cultivated Trees and Shrubs*, which is still used today, was on the Arboretum staff at that time, too. One day I timidly asked this German-born scholar for the correct botanical name of a certain plant. Rehder went to several books and after a few minutes looked up, exasperated, and said, "The synonymy is very confusing." That was the understatement of the year coming from Rehder, who was the leading woody-plant taxonomist in America.

What is your favorite small tree?

If I had one it would be our native flowering dogwood (*Cornus florida*), I suppose. We have a lovely one here called 'White Cloud'. There are, of course, a number of cultivars, but I think more selection is still needed for clearer whites and pinks, prolific bloom and for extension of the flowering season. I'm fond of Japanese flowering cherries as well. There have been more selections of them for such traits but this has been done over centuries—and they can still be improved.

And a favorite shrub?

I am fond of many. Lilacs, it goes almost without saying. They have variety, and there are different fragrances among them, too. People sometimes complain about the height of *Syringa vulgaris* but there are lower growing sorts. The lilac *S. palibiniana* (now grouped with *S. patula*) grows slowly to only 5 or 6 feet.

Our native azaleas have been terribly neglected. I like them and think they have

great breeding possibilities. Incidentally, a special garden of them is being started at the Bayard Cutting Arboretum in Oakdale, New York.

The past summer I have been taken with a relatively new rose-of-sharon (*Hibiscus syriacus*) called 'Diana,' a shrub which was bred at the National Arboretum by Dr. Donald Egolf, who has been doing marvelous work with crape-myrtle and pyracantha, too. 'Diana' is a white-blooming triploid that produces no seed. It flowers for us from July 4th to Labor Day.

Do you have any advice for new gardeners?

Start with annuals. I didn't grow anything but annuals for the first 5 or 10 years, I guess. There is a quick return in flowers from them, and the new gardener is indeed impatient. As interest widens, one invariably turns to other plants.

I still grow ageratums in my garden each year, however. ❀

WILL IT BLOOM THE FIRST YEAR?

Yes—if it's an annual!

John C. Wister

While there may be some extenuating circumstances which make it necessary to sympathize with people who want fast-growing trees to put in new and barren places, it is hard to find any excuse for those who ask the question "Will it bloom the first year?" when any flowering tree, flowering shrub, or herbaceous

The author served as Editor of PLANTS & GARDENS from 1946 to 1948 and has been a frequent contributor over the years. This article appeared in the Summer, 1948 P&G. The price of annual seed packets has increased to 40 or 50 cents but the point Dr. Wister makes is as valid as ever.

perennial is mentioned. Whether or not it will bloom the first year is not the point—where these plants are concerned.

Anybody who wants plants to bloom the first year can have them for the large sum of 5 or 10 cents by buying a package of seeds of zinnia, or petunia, or nasturtium, or any one of a hundred other ordinary, commonplace, but lovely and beautiful annuals. There are plenty of them, more than any single garden can hold.

But to link that question with any permanent plant is enough to make a real gardener utterly discouraged.

Why not be willing to wait a while for

something that is good? Why not plant the right size, and wait two years, as is necessary with most perennials—or three to five years, as may be needed with peonies, to get them well established? The late T. A. Havemeyer, long president of the Horticultural Society of New York and one of the greatest growers of lilacs this country has ever had, often remarked that no one could tell the worth of a lilac in less than ten years. I think of that every time a person asks me, "How soon

will this lilac bloom—will it bloom the first year?" It is hard to say to such a person that if the lilac should bloom the first year, probably the best thing to do would be to cut off the flowers before they opened.

I cannot see the hurry; there is always the nasturtium to fall back on. It is a beautiful flower, and I am very fond of it. Let us use it more, while we are waiting for the more permanent plants to develop; but let us not confuse the two values. ❧

The nasturtium, a sunny summer annual at home in the poorest soil and thriving on neglect, is ideal for the beginner but not underestimated by the experienced gardener.

Roche



The B.B.G. Director suggests some . . .

SOUTH AFRICAN PLANTS FOR AMERICAN ROCK GARDENS

Elizabeth Scholtz

It is strange how your ideas on gardens change as your experience widens. As a little girl in South Africa and indeed until I came to the United States 16 years ago, I thought of rock gardening as being synonymous with growing succulents in rocky situations in the Transvaal. It was the practice of gardeners like my mother to venture out into the open grassland of the countryside, known as the veld, and bring back attractive boulders. These would be placed in an artistic fashion in the garden and little pockets of soil made in which to plant aloes.

Endangered Flora

When I was growing up it was common to dig the aloes and many other plants from the wild. Why not? They seemed so common, the tree aloe (*A. arborescens*) and hundreds of other smaller-growing aloes (some only 6 inches tall). And also, as we learned at an early age, South Africa had one of the richest floras of the world, with many kinds of plants found nowhere else. In just one genus alone, the ericas or heaths, there were more than 600 species south of the Limpopo River. The veld had an incredible variety of plants and anyone seeing this area in flowering splendor in the South African spring, which lasts from September to November, could not conceive of some of these plants becoming uncommon.

Today South African wildflowers are protected by strict laws. All over the world in the last 20 years there has been an increased awareness that natural resources, which in a real sense include the plant kingdom, have finite limits. According to some calculations, as much as 10% of the world's flora is in jeopardy because of industrialization, urban sprawl, tillage

of new lands, construction of hydroelectric projects and other changes that have affected everyone everywhere.

The continent of Africa, perhaps to an even greater degree than other parts of the globe, has been experiencing these changes, too. Many dilemmas have occurred for 20th-century man, not the least of which is how to bring about rapid economic growth without destroying the delicate if approximate natural balances we depend on over the longer term. Because South Africa's plants are unique and have much to give the world, it is essential to preserve as many of the species as possible by one way or another. One way, it seems to me, is to get to know them as garden plants in America.

Plants We Know

Some South African plants have become well established in American gardens. The visitor to southern California sees *Gazania*, *Arctotis*, *Dimorphotheca*, *Gerbera* and *Osteospermum* (all conveniently termed African daisies here) in home gardens, parks and even along freeways. The Los Angeles State and County Arboretum, in particular, has been breeding and selecting good forms of these plants for California conditions. The Kraanvoelblom (bird-of-paradise) may have been adopted as the official emblem of Los Angeles, but the "African daisy" has become the California daisy.

One of the largest collections of succulents anywhere is at the Huntington Botanical Gardens in San Marino; a number of the plants grown there are of South African origin. Proteas, the monarchs of the South African flora, are raised near San Diego (and on the island of Maui in Hawaii) for the cut-flower trade. Along



Elizabeth Scholtz

Arctotis and other native South African composites seen frequently on the Members' Tour led by the author, Autumn, 1976.



Ixia, left, adaptable with winter cover to gardens of the mid-Atlantic states. Right, *Lachenalia aloides aurea* looks much like a cross between a bromeliad and Indian pipes.

J. Horace McFarland

the entire coast iceplants and other mesembs (short for *Mesembryanthemum*, the old generic name for these succulents) flower in bright profusion, some of them being so well established that visitors think of them as native to the state.

To a lesser extent South African plants are grown in other parts of the United States, mostly as bedding annuals and container plants, and occasionally as bulbs in cool greenhouses. Large American seed-catalog firms usually list flame-lily (*Gloriosa superba*), *Gazania*, *Arctotis*, *Ursinia*, *Venidium*, *Felicia* and *Nemesia*, an attractive annual that is a delightful change-of-pace from pansies in window boxes and other planters where summers are cool or springs are long. A much better known South African annual that is grown in containers is *Lobelia erinus*. Some of these plants, especially the lower-growing daisy sorts that require full sun, lean soil and sharp drainage, have a transient place in northern rock gardens, where summer color is often much needed.

Actually very few South African perennials can endure the extended cold of northern American winters, although gardeners in the mid-Atlantic states are able to successfully overwinter the red hot poker or tritoma (*Kniphofia*) which in cultivation frequently have orange-red flowers, though color variants are becoming popular. The handsome and fragrant Cape- or summer-hyacinth (*Galtonia candicans*) is also hardy in the New York area. There is, however, a great deal to be learned about the limits of hardiness of various South African species, many of which have not been widely grown in America. Recently, for example, I was informed of a collection of gladiolus species from South Africa that a New Jersey gardener had no trouble overwintering.

Gladiolus

It is a pity that American gardeners know only the giant hybrid gladiolus and that these have been bred mostly for cut flowers. Of the 200-or-so species of gladiolus more than half are native to South Africa.

Paul E. Genereux





George Kalmbacher

Babiana 'Zwanenberg Glory', more cupped than *Ixia*, has unusual pleated leaves.

Only about seven have really been used in hybridization. Some of the little known species are absolute charmers in the garden, possessing an innate refinement that their bolder, larger cousins have lost over the years.

Gladiolus tristis is one of these. I see it occasionally at flower shows in this country but am surprised that more people here don't try growing it as a half-hardy bulb in rocky crevices. The carnation-scented blossoms are often ivory or cream yellow and tinged with mauve on the outside. The plant grows only a foot tall. A little experimentation of this kind is bound to yield many pleasures for the discerning gardener, even if it means mulching the plants well in winter or lifting them for storage.

In South Africa the best known gladiolus is the Kalkoentjie, which means little turkey. The upper petals are orange and the lower ones greeny-yellow flushed with orange. Another attractive species, *G. carneus (blandus)*, is called the painted lady; it has blush pink flowers with crimson markings. One of the most charming and of somewhat greater stature is the Caledon-bluebell (*G. bullatus*) with its delicate reedlike stems and mauve to

blue flowers with varied markings. None of these gladioli grow very tall nor do they have the stiffness of the cultivated varieties. There is great variation in flower color and the spikes last a long time if cut.

Other Bulbs

There are other low-growing South African bulbs that might make good rock garden subjects in different parts of the United States if given some winter cover, particularly where borderline hardy. These include *Sparaxis*, *Ixia*, *Bulbine* and *Lachenalia*. Bulbs of the first two, when offered by American seed houses, don't cost much more than crocus, but a good selection of species is unavailable here. The flowers of *Ixia monadelpha*, for example, resemble lalique glass and range from mauve to misty blue and yellow. *Lachenalia bulbifera* would be interesting to try in a rock garden in milder areas, as would the golden lachenalia (*L. aloides aurea*). The latter makes a splendid pot plant. Like most South African bulbs they need friable soil that drains very easily.

Among the bulbous plants I am fondest of in the greenhouses at the Brooklyn Botanic Garden is *Cyrtanthus mackenii*,

which has cream-colored flowers. *Cyrtanthus* species, of which there are many, are often called fire-lilies in South Africa because they bloom after veld-burning in early spring. This is a long-standing practice to facilitate early grazing for the cattle. There is still a great deal of cattle and sheep farming in the veld, and after a long, dry winter it is important to provide new fodder quickly for the animals. A light burning encourages the fast sprouting of grass—as well as the *Cyrtanthus*. A number of them are red-flowered, and some are fragrant.

Not very many *Babiana* are available in America. They resemble *Ixia* but have more “body” and attractive pleated leaves. There are some beautiful sorts called winecups, which include two types, *Geissorhiza rochensis* and *Babiana rubrocyanea*. Both have much the same flower color, the top of the petals being amethyst and the centers crimson. While many plant names commemorate famous people, *Babiana* honors the baboon. The plant is so named because it is the habit of these animals to dig in the veld and root out the bulbs for food.

Other Plants

In South Africa one of the most popular rock garden plants is a mesemb called

Dorotheanus bellidiformis, or, in Afrikaans, Bok Bay Vygie. This compact jewel has a tremendously wide color range—yellow to crimson and deep purple. The plant doesn’t get over 3 inches tall and the daisylike flowers are only half an inch across. This succulent is sometimes grown in California under its old name, *Mesembryanthemum criniflorum*. It is not hardy in the North but would be a candidate for the cool greenhouse.

On the 1976 B.B.G. Members’ Tour of South Africa, I think our travelers were as fascinated by the many beautiful oxalis as by anything we saw, except perhaps the dainty little irislike moraeas. This may seem strange to gardeners who know only the small yellow-flowered *Oxalis stricta* that is such a common weed in the United States. However, South Africa has its share of large-flowered kinds, including ones with pink or rose-purple blossoms such as *O. howiei* and *O. purpurea*. These easy-to-grow “shamrocks” are occasionally grown as house plants in America. A very well known South African oxalis, the so-called Bermuda-buttercup (*O. pes-caprae*), has escaped from cultivation in mild climates around the world.

The oxalis are of course weeds in South Africa but are never completely

Rose geranium (*Pelargonium graveolens*), like most pelargoniums a South African native, has been bred for improved appearance and rose fragrance.

Roche



eradicated by home gardeners because they are charming in a lawn, around the trunk of a tree or in the cracks of a flagstone terrace.

I know our members enjoyed seeing the homerias, especially the painted homeria (*H. elegans*), which has yellow tuliplike flowers. Another species, *H. breyniana*, occurs widely in the countryside. It is highly toxic to cattle but casts a beautiful salmon glow over the fields in spring.

Pelargoniums

Most of the world's 280 species of *Pelargonium* come from South Africa. In the 1770's the Royal Botanic Gardens (Kew) in England sent abroad its first collector, Francis Masson, who voyaged to Cape Town with Captain Cook. Masson returned with 400 kinds of plants, including fifty pelargoniums. One of the best known pelargoniums, *P. zonale*, actually introduced to Holland and England some years before, became a principal parent of the common bedding geranium (*P. x hortorum*). Today more than 35 million of these plants are sold in the United States alone in the course of a year.

I don't suggest using the common geranium in rock gardens but there are many lovely scented pelargoniums that would give a dainty touch to such areas. Each summer at the Brooklyn Botanic Garden we plant a few in the Fragrance and Herb Gardens and, judging from the comments of visitors, I think they are well received.

Such geraniums might include the rose- (*P. capitatum*), coconut- (*P. grossularioides*), apple- (*P. odoratissimum*) and peppermint- (*P. tomentosum*).

There are many cultivars of scented pelargoniums now. All of course must be brought in before autumn frost in New York but can be grown outdoors year-round in the Deep South and California, where they attain shrubby dimensions and sometimes spread from cultivation, as happens with the ubiquitous ivy geranium (*P. peltatum*).

The South African pelargoniums are interesting because of their herbal employments over the years, too. The Bantus make a tea from the leaves of many species and drink it to alleviate chest disorders. The foliage is also burned by them as an asthma treatment. *P. capitatum* and other kinds have been cultivated extensively in southern France, providing an essential oil used in perfumes.

Further Readings

Would you like to know more about South African plants? The B.B.G. *Handbook on Succulents* (#43 in our series) gives capsule information on a number of interesting kinds. One of the best longer treatments I know is Conrad Lighton's *Cape Floral Kingdom*, published by Juta & Co., Cape Town and Johannesburg. This is a fascinating historical account. It is available from the book service of Honingklip Nurseries, W. J. and Mrs. E. R. Middelman, 13 Lady Anne Ave., Newlands, Cape, South Africa. Other books from the same firm include Sima Eliovson's *South African Flowers for Gardens* (comprehensive plant descriptions and extensive horticultural information) and Una Van Der Spuy's *Wild Flowers of South Africa for the Garden* (excellent color photographs, good descriptions). ❀

SOURCES FOR SOUTH AFRICAN PLANTS

Seeds anyone? George W. Park Seed Co. (Greenwood, S.C. 29647) and W. Atlee Burpee Co. (300 Park Ave., Warminster, Pa. 18991) have a better-than-average listing of South African species. See page 37 of Margedant Hayakawa's article for another source, the Botanical Society of South Africa. A few kinds of bulbs are available from De Jager, S. Hamilton, MA 01982 (catalog fee), Van Bourgondien, Box A, 245 Farmingdale Rd., Bablyon, N.Y. 11702, and International Growers Exchange, Box 397, Farmington, Mich. 48024 (catalog fee). Scented pelargoniums are available from Logee's Greenhouses, 55 North St., Danielson, Conn. 06239 and Howe Hill Herbs, Camden, Maine 04843. Both firms have a catalog charge. ❀

DON'T SLIDE DOWN MY CELLAR DOOR

Carlton B. Lees

Reprinted from GARDEN JOURNAL of the New York Botanical Garden, August, 1976.

Where I grew up in Connecticut, it was called a *hatchway*, but I have found the term *bulkhead* in much more common use. At any rate, the kind of cellar door down which as small children we used to slide is here converted into a greenhouse of sorts. Remembering my grandfather's double-doored hatchway which faced due east, I was delighted to move into a house which has one facing south. I'd be even happier though if it were double.

The process was simple—a standard 3-by 6-foot coldframe sash was enlarged to fit the existing opening after the old doors had been removed. Coldframe sash, one of the most useful of man's devices to a gardener, is becoming increasingly difficult to find—even secondhand. This one was a gift. Even with two or three panes of glass missing it is one of the nicest presents I have ever received. The advantage of coldframe sash is in the fact that the glass overlaps—shingle-like, just as does greenhouse glass. The same thing could be achieved with old storm sash. Large panes of glass typical of old storm windows are very easy to break, how-

ever, and it is necessary to cut grooves in the horizontal mullions and at the bottom of the sash to allow run-off of rain water.

Luckily, this cellarway leads to a small vestibule where I have built a potting bench under the east-facing cellar window. The interior walls of this vestibule have been painted stark white for maximum light reflection. One doorway from this vestibule leads into an earth-floored cold cellar in which is stored a winter supply of potatoes, beets, rutabagas, and which houses a rather meager, but nonetheless enjoyed, wine cellar. This cold storage room is also used for rooting potted bulbs—daffodils, tulips, hyacinths—for deep winter storage of a fig tree, and for other plants and roots at various stages of dormancy at various times of the year.

Another doorway from the vestibule leads through a small storage space into the laundry room where water is available and pots and plants are washed. Over the laundry tub, also facing south, are some generous windows for growing smaller plants at a warmer temperature. The

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The hatchway, a most unlikely looking candidate for becoming a greenhouse, fortunately faced south.



Above, with sashes fitted into place, the hatchway is transformed into a greenhouse. Below, painted white to reflect light, the greenhouse is stocked with camellias, cymbidium orchids, spring bulbs and other plants that prefer cool night temperatures.

night temperature in the laundry room is about 60°, whereas that in the hatchway greenhouse gets down below 50° in the coolest weather. Temperatures are controlled through manipulation of doors between the laundry room and vestibule and between the laundry room and cellar proper. A small fan mounted on the ceiling draws air from the warm cellar into the greenhouse-like space on coldest nights and the cold air returns along the floor to the warm part of the cellar. On severe nights (when the temperatures are 15° or below) old blankets are used on the cold frame sash to prevent heat loss. Fortunately, in Brewster, New York, there were few such cold nights in 1975 and 1976.

The photograph reveals that this greenhouse space works very well for camellias and all sorts of spring bulbs. It is a good holding place for geraniums; cymbidium orchids thrive here. The only problem is that it is much, much too small. ❀

Garden Journal N. Y. B. G.



MOUNTAIN-LAUREL— CINDERELLA OF THE FOREST

Richard A. Jaynes

From THE BULLETIN of the American Association of
Botanical Gardens and Arboreta, April, 1976

Sometimes our closest friends surprise us with revelations about themselves. The information may be volunteered or it may be elicited with gentle persuasion. Perhaps we have an analogous situation with mountain-laurel (*Kalmia latifolia*). It is a longtime friend of the gardener, a plant native to the acid soils of the eastern United States, and held in high enough esteem to be the state flower of Connecticut and Pennsylvania. Yet, we are just learning some of the secrets of this Cinderella of the forest.

Surprising to most is the extensive variation within the species. Some of the unusual types, such as plants with banded flowers or miniature habit, have been known for a century. New variants have recently been discovered and others, such as those with deep flower color, have resulted from recurrent selection in the garden and nursery. Breeding promises to further extend the range and assortment of attractive mountain-laurel cultivars.

There are seven species of *Kalmia*, all North American. In addition to mountain-laurel they include sheep-laurel (*Kalmia angustifolia*); white wicky (*K. cuneata*); sandhill-laurel (*K. hirsuta*); western-laurel (*K. microphylla*); eastern bog-laurel (*K. polifolia*); Cuban-laurel (*K. ericoides*). Variants with special ornamental value have been selected from all of these species, but domestication of types most suitable for the garden has proceeded farthest with mountain-laurel for at least two reasons: the wild plant adapts readily to the garden and variation within the species allows for the selection of a range of garden types.

Botanical Forms

Some 25 distinct kinds of mountain-laurel are known and considering the possible recombinations there could literally be hundreds of unique sorts developed. Most of the variants are relatively unknown and unavailable commercially*. Unusual botanical forms of horticultural value include:

Willow-leaved mountain-laurel (*K. l. angustata*). As the name implies the leaves are very narrow. Older plants have a graceful flowing form resulting from the leaf form and their arching habit. A large plant exists at the Henry Foundation in Gladwyne, Pennsylvania.

Miniature mountain-laurel (*K. l. myrtifolia*). This is a charming plant of the mountain-laurel type but with reduced stature, miniaturized throughout. It is very rare in the wild. Miniature habit is recessively inherited compared to normal habit. When two miniature plants are crossed all the offspring are miniature; however, variation occurs among such seedlings for leaf shape, flower color and other characters, but they are recognizable as the form *myrtifolia*.

Banded mountain-laurel (*K. l. fuscata*). The flowers are distinguished by a darkly pigmented, brownish purple or cinnamon colored band on the inside of the corolla.

* A list of commercial sources of *Kalmia* is available from The Conn. Agr. Exp. Station, Genetics Dept., Box 1106, New Haven, Ct. 06504. Please send stamped, self-addressed, business-size envelope. Vegetative propagation of named cultivars is still limited. Red-budded, deep pinks, and banded are listed by a few nurseries. Most of the other types referred to are not yet commercially available.



George Taloumis

Mountain-laurel (*Kalmia latifolia*) has given rise to many variations and cultivars now becoming popular in gardens.

Usually the band is about 4 mm in width, but it may be narrower and interrupted, or so broad as to virtually color the entire inside of the corolla. Expression of banded is apparently under the control of a single dominant gene. About 50% of the seedlings from a banded plant crossed

with a normal have banded flowers.

Feather-petal mountain-laurel (*K. l. polypetala*). This form is noted for the cut corolla which results in five strap-shaped petals. Normally it is not an attractive ornamental because the petals are too narrow and rolled. A plant with firm, broad



Connecticut Experiment Station

petals would be a valuable find. A recently found variant named 'Shooting Star' is notable because the corolla is partially cut and the lobes tend to reflex like a *Dodecatheon*. An added feature of 'Shooting Star' is that it flowers about two weeks later than normal for the species.

Intensely colored forms have resulted from several generations of selections in the garden and nursery. The late C. O. Dexter of rhododendron fame reportedly selected deep pink forms from the wild, grew seedlings from them, and again selected those with deepest flower color. This process was repeated several times and continued by the Mezitts of Weston Nursery, Hopkinton, Massachusetts. Each generation of selection resulted in more plants having a richer flower color. Approximately five generations of selection resulted in plants with an iridescent, redbud color and other plants with a rich, deep pink flowers, both in bud and when open. Ten years ago a solid, red-flowered mountain-laurel did not seem possible, but each generation of plant selection moves us closer to that goal.

A cultivar of willow-leaved mountain-laurel (*K.l. angustata*) has been named 'Willowcrest'. The arched leaves give a graceful flowing form to the plant.

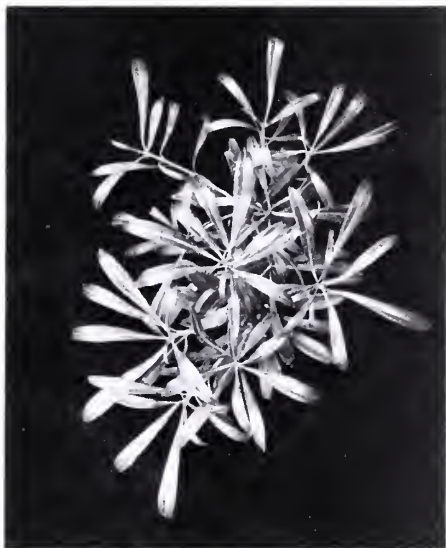
The miniature mountain-laurel (*K.l. myrtifolia*) is extremely rare in the wild.

Work in Connecticut

Our role at the Connecticut Agricultural Experiment Station has been to pull together the information and available plant material, to learn how some of the ornamental traits are inherited, and to use this information to further extend the color range and the development of attractive ornamental laurels. Along the way we have become involved in the taxonomy, cytology, seed and vegetative propagation and other cultural aspects of this plant. *Kalmia* has been a wonderful genus with which to work and one that will continue to respond to further efforts.

Our new selection from a second generation cross of banded with red-budded mountain-laurel combines the two traits in a plant that is extremely attractive in bud and eye-catching when the flowers fully open. Many other attractive new kinds of ornamental mountain-laurel should be developed by recombining known forms. For example, miniature mountain-laurel can be reproduced true from seed. By appropriate crosses a whole series of miniatures incorporating

Connecticut Experiment Station





Connecticut Experiment Station

A variant of the banded mountain-laurel, *K.l. fuscata*, in which the maroon pigment virtually fills the center of the corolla.

red bud, banded or pink flowers, as well as other foliage traits, is possible.

There is still much to learn about the best ways to propagate mountain-laurel. Time from seed sowing to flowering is commonly 5 to 8 years. Cuttings are somewhat faster when they can be induced to root and then break dormancy. Selection of clones that will root is important. Commercial production of plants in the future will probably be in containers, using a non-soil medium with high porosity, such as some of the bark mixes.

Mountain-laurel remains a species ripe for horticultural exploitation. The sibling *Kalmia* species are also in need of further selection and breeding to develop improved garden selections. There are certainly other genera of plants adapted to North America that are similarly ready for domestication. Botanic gardens and

arboreta can and will play a role in their development by maintaining unique collections. There is a danger for horticulturists and their institutions to dabble and collect everything at the risk of not being outstanding in anything. There are decided advantages to the respective institutions, researchers, plant societies, nurserymen and the public for each garden or arboretum to have definitive collections of one or more genera. Certainly if a good *Kalmia* collection had existed our start-up time would have been considerably shortened. It is through such collections that there will come additional appreciation for specific plants and their ornamental development. The rediscovery of old laurels and the breeding of new ones suggests that other Cinderellas exist in the garden and forest and merely await our attention. ❧

A FIRMIANA GROWS IN BROOKLYN

The parasol-tree (*Firmiana simplex*), which is native from Vietnam to the Ryuku Islands of Japan, is occasionally grown along the Gulf of Mexico, in the Southwest and in California for its attractive foliage, green bark and large lemon-colored flower clusters that appear in early summer. This member of a largely tropical family, the Sterculiaceae, does indeed lend a tropical appearance to the landscape. The leaves, which are a foot across, resemble those of a giant sycamore. *Hortus Third* gives the tree a hardiness rating that suggests it should be grown only in the Deep South. Surprise! It's been growing at the Brooklyn Botanic Garden for about 50 years.

The late beloved Alys Sutcliffe, who was a longtime B.B.G. staff member, once recalled that in the 1920's there was a parasol-tree in the Conservatory, where it grew so vigorously that it had to be removed. Montague Free, who was Horticulturist then, decided to take a chance on transplanting it outdoors, near an east-facing slope on the Flatbush Avenue side of the Garden. It was, according to Miss Sutcliffe, mulched heavily the first few winters until the roots became deeply established.

The parasol-tree, despite periodic setbacks, eventually grew to 40 feet and flowered and fruited, although not every year. About 1967 a severe canker condition was discovered and the old specimen had to be cut down. Root cuttings were taken at the time and a replacement tree from this stock was eventually set out in the same spot, south of the Rock Garden. It is multistemmed as a result of winter damage in its early years. The height is now 15 feet, and flowering occurred in 1976. ❀

Close-up of *Firmiana simplex* shows its unusual foliage, one reason why B.B.G. took a chance on its hardiness when it outgrew the greenhouse.

Brenda Weisman



HIGH-HATTING THE GARDEN

An Anonymous Botanist

Reprinted from NEW ENGLAND WILD FLOWER NOTES,
a publication of the New England Wild Flower Society

My garden flowers, I must confess,
I much prefer in English dress.
And when my stately larkspurs come
I don't call them *Delphinium*,
Nor point with pride to columbine
And say, "My *Aquilegia* are fine."
Forget-me-not of tender blue
As *Myosotis* will never do;
Nor *Digitalis* claim the love
I cherish for my pink foxglove.
The lily-of-the-valley's sweeter
Than *Convallaria*—and neater;
While *Dicentra spectabilis*
For bleeding heart, mere babble is.
Sweet pea's the name I'll give them ever—
Lathyrus odoratus- never.
The rose is sweet as Shakespeare's sung
By any name, in any tongue;
But English primrose far more fair is
Than Latin *Primula vulgaris*.

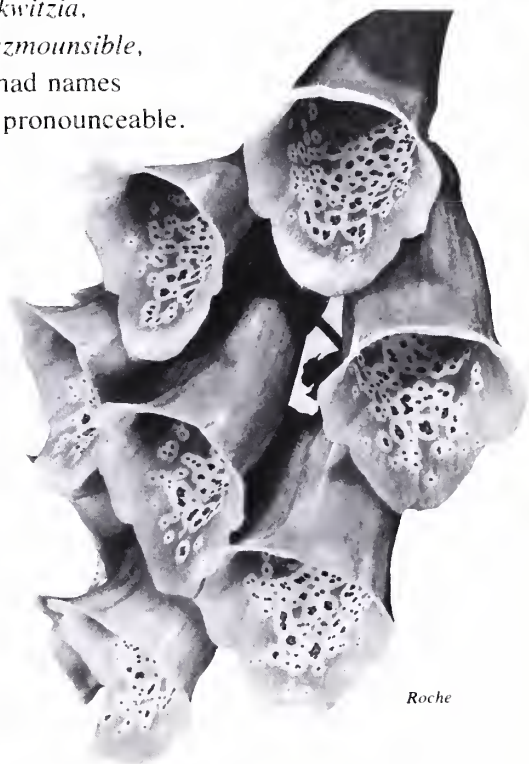
Another botanist replies—

Leopardsbane is all right for some
But I like the name *Doronicum*.
Bishop's hat or Bishop's cap, which one?
Why not just plain *Epimedium*?
It's London pride but better far
Is *Lychnis chalcedonica*;

And bleeding heart, I know it is
Just *Dicentra spectabilis*.
Is Japanese rose any sweeter
Than *Rosa rugosa*? or any neater?
Poor man's orchid or just blue flag
Is just *Iris*, which is not bad;
And *Coronilla* is to me
Better than crown vetch could ever be.
Trillium or *Daphne* or *Cleome*
Latin or not, they seem good to me.

A non-botanist replies to both—

The naming of the plants I know
Is quite a sticky wicket,
A simple little moniker
Would be perfectly cricket.
But when I read *Kolkwitzia*,
Fouquieria and *Guzmounsible*,
I wish the botanists had names
A great deal more pronounceable.



Roche

A seasoned gardener discusses . . .

HERBS— PERSONAL FAVORITES AND AN INVITATION TO SEE THEM

Bernard Currid

The year 1977 marks a special birthday within the Brooklyn Botanic Garden. It is the 40th anniversary of the Herb Garden, and on June 10 and 11 there will be a symposium in recognition of a project that has come to fruition. This is very appropriate because few gardens in the larger B.B.G. framework have given as much pleasure to visitors. I know, because for the last nine years the care of the Herb Garden has been one of my main responsibilities. In my work I often overhear the friendly remarks of people young and old and am convinced that the interest in herbs is ever growing.

Overseas and Here

My own interest in herbs began many years ago when I was a boy in Ireland, a land with a healthy respect for all plants—culinary, medicinal or otherwise. Avocation became vocation after I moved to England at the age of 18, where I eventually trained in horticulture at Lancashire Agricultural College and gardened in different parts of that country.

Herb gardening in England and America is not quite the same art because of the differences in climate, but there are continuing challenges on this side of the Atlantic which make the work always stimulating. Although many of the common herbs are from the Mediterranean region, where summers are hot and arid, they thrive in England, where rainfall is considerably greater than in, say, Greece or Italy during the mild months of the year. With a little nurturing they thrive here, too.

Because a plant has its origins in dry, rocky or sandy soils does not necessarily

mean that it will perform best in the garden under such circumstances. Whether in England or America, I have discovered that plants generally, including most herbs, respond to good basic garden care.

Such care consists of proper soil preparation, including the thorough incorporation of compost as well as a periodic soil test, the broadcasting in very early spring of a commercial fertilizer (5-10-5 at 3 pounds per 100 square feet), and timely pinching of new shoots of certain taller-growing herbs (especially mints and their kin) before they get leggy; also, mulching with an inch or two layer of a material like buckwheat hulls (mixed with a little



Gottsch-Schleisner

Angelica



J. Horace McFarland

Chives

sawdust so they won't cake) to conserve soil moisture and discourage weeds. These are worksavers over the longer term, but even then I find it desirable to lightly cultivate the garden at least every two weeks to keep it fresh and orderly.

People sometimes ask what herbs I like best. Since my work also involves the care of the Botanic Garden's extensive annual and perennial borders and Magnolia Plaza, I confess to a fondness for low-maintenance plants. It should be understood that this is a much abused term because some herbs are only low-maintenance sorts provided you work within their limits. All garden plants require at least some care, and the heart sometimes chooses favorites that the mind frowns upon. The fascinating history and lore of many herbs is reason enough to grow them. Of the more than 200 kinds at B.B.G., here are ten of my favorites. None, to my way of thinking, needs undue coddling.

The First Five

Mints (*Mentha*) would always be included in any garden of mine. What beverage is more satisfying on a hot summer day than

mint tea? I like all mints but have a special fancy for the orange one (*M. piperita citrata*).

Most of the common mints can be weedy if you give them a chance. Don't! A labor-saving technique is to plant them within a two-foot-wide open-ended box that is 6 inches deep and sunk in the ground almost to the rim. It needn't be deeper because the mint roots spread along the top couple of inches of the soil. If possible, use cedar wood because it may last as long as 6 years in the soil before decaying. Early each spring take up the clump and divide it, discarding the woody center. If any roots escape the box during summer, chop them out immediately, not tomorrow. A hoe in time saves woe.

Angelica (*A. archangelica*) is one of the most stately of all herbs, having a distinct shrublike appearance when in flower in early summer. The bold umbels of white blossoms are borne on stalks from 3 to as much as 6 feet tall. This generally biennial species is of very easy culture provided it has sun and proper drainage—as most herbs need.

One of the myths of gardening is that biennials require too much care for the busy person, but I haven't found this to be so with a number of these plants. To the contrary, they require less if they are species that self sow in moderate num-



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Sweet woodruff

bers and can be reset. After angelica blooms I allow a few fruits to ripen on the plant and let them deposit their bounty of seeds for the future. The ideal situation is to have first-year (*i.e.*, vegetative) plants coming along to take the place of second-year (*i.e.*, flowering) ones when the latter die after bloom.

Angelica, a native of Europe and Asia, has had its place in cooking over the years. Young leaves are used to flavor seafood dishes, the blanched stalks are eaten as celery, and the roots and stalks have been used in liqueurs. Some old-timers remember angelica candy, too. I just like the plant for its many fine garden qualities.

Chives (*Allium schoenoprasum*) are one of the commonest and most useful plants in kitchen gardens. I think they rank among the most ornamental herbs, even deserving a place in the flower border. The rosy-purple flowers of this Eurasian perennial are handsome by themselves and can even be air-dried for home decoration if stalks are cut before the blossoms open fully.

Occasionally gardeners are reluctant to snip the onion-flavored leaves in May before flowering, but a reasonable compromise is to cut the ones away from the viewing side of the plant if you have a sudden and overwhelming urge for sour cream and chives with baked potato. In any event it's a good practice to shear the foliage back to the ground after bloom to increase vigor. In a few days new growth

will appear. If you have ever noticed the price of frozen chives in the market in winter, this is the time to start snipping the foliage for storing in the freezer. Chives divide easily at any time of year and many people like to bring in a few divisions in autumn to grow on a sunny windowsill for cold-month use.

Sweet woodruff (*Asperula odorata*) is one of the few herbs that makes an excellent low-growing perennial ground cover. For us it serves as a nice foil under *Rosa rugosa*. Nearby are forsythia and a retaining wall which help keep it in bounds. In moist, shaded spots sweet woodruff grows quickly and can be invasive, but a little root competition plus judicious use of the spade keep it honest. The dainty white flowers are attractive for several weeks in May, and the finely cut, deep green foliage persists almost to winter. It is used to flavor the German May wine. According to *Hortus Third*, the correct botanical name for sweet woodruff is now *Galium odoratum*, but it will probably be a few years before this becomes current terminology of the gardening realm.

I have a sentimental attachment to pot-marigolds (*Calendula officinalis*) that goes back to childhood days in Sligo. This annual, originally native to southern Europe, was present everywhere, it seemed, and the bright yellow or orange flowers lasted a long time, especially if the weather was cool. I vividly remember pot-marigolds along the path leading to our front door. They were one of those

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Pot-marigolds

dooryard plants that always came back year after year from self-sowing. This doesn't happen as often in Brooklyn, so we raise a few seedlings under glass each spring for the Herb Garden. The relatively new dwarf varieties have become standard here because no staking is required.

Pot-marigolds have had many culinary uses. Occasionally the petals are still employed to give color to puddings and stews. They have been used medicinally, too.

Another Five

Caraway (*Carum carvi*) is a self-sowing European biennial that I like very much for its refined foliage and small carrot-like white flowers. I treat it like angelica, leaving a few seeds to self sow and provide plants for the future. Caraway grows to about 20 inches and blooms in early summer here.

Coriander (*Coriandrum sativum*) is a southern European annual with an unusually short life span even for an annual, but I am fond of this culinary herb for its feathery aromatic leaves and small white flowers, too. For continuing garden effect it's wise to sow seeds directly in the garden at intervals of several weeks. If they are started under glass they come along almost too quickly. The best plants I recall ever having were volunteer seedlings coming to their peak one September after most other herbs had gone by. However, they aren't dependable self-sowers in the New York area. Coriander grows 2-3 feet tall.

Foxglove (*Digitalis purpurea*) is an important medicinal herb because, when properly extracted, a substance in the foliage stimulates heart activity. (Don't try home remedies; the leaves are toxic.) I like the conspicuous drooping purple bell-like flowers of this European biennial. The blossom spikes rise to 2 feet or more in late spring. A little self-sowing occurs at B.B.G., but we find it safest to raise a few plants under glass each year for the Herb Garden.

What would a traditional garden be without lavender (*Lavandula angustifolia*; formerly *L. officinalis*)? The flowers have justly given a name to a color.



J. Horace McFarland

Caraway

When the spikes appear in June on plants forming a low hedge that borders the Herb Garden, they provide a fine welcome to visitors on their way to see the hybrid teas in their first burst of bloom in the nearby Cranford Rose Garden.

Lavender, which is actually a low woody shrub with persistent leaves, is as valued for its gray foliage as for its scented blossoms. If there is winter injury we cut plants back to 6 inches of the ground in very early spring. No harm is done by this because they flower from new wood. In fact it's a good idea to prune them moderately at this time of year anyway, since growth will be thriftier and more compact.

The most striking plant in the Herb Garden in very late summer when its yellow sunflowers appear on stalks 9 or 10 feet tall is Jerusalem-artichoke (*Helianthus tuberosus*). This is the only plant on my list of ten favorites that needs staking, and it requires additional care in one other respect, too. The tubers, unless restrained by planting in a large plastic container (and the container then plunged almost to ground level), are dreadfully invasive. Each spring with



Coriander

Peter K. Nelson

some effort I uproot the container and remove all but two or three tubers before resetting. Virtually all of the soil in the container is forced out in a year by the rapidly growing tubers.

Some people like to eat the mildly flavored tubers, which are praised highly by health-food fanciers. I prefer to grow the Jerusalem-artichoke for its ornamental traits, even though it is the only vegetable native to the cooler regions of North America.

In this instance the name "Jerusalem" is a corruption of the Italian word *girasole*, meaning turning to the sun, and has nothing to do with geographical origins of the plant. Jerusalem-artichoke was brought to Europe at an early date and was apparently more esteemed for its

culinary uses in southern parts there than it was in the New World (except by the Indians). It should not be confused with the globe artichoke (*Cynara scolymus*) that is common in supermarkets. The latter plant, which has purple thistly flowers and bold gray leaves, needs protection to survive New York winters.

A Cordial Invitation

If you visit New York in June or anytime in the mild months, why not plan to see the B.B.G. Herb Garden? It would be our pleasure if you were to share with us in the 40th birthday party of one of America's leading collections of culinary, medicinal and scented-foilage plants.

I haven't even mentioned the two Elizabethan knot gardens which form the central axis of the Herb Garden, or the Fragrance Garden for the Blind, a short distance away. For a bit of background on them see Nancy Shopis's and my articles in *Herbs and Their Ornamental Uses* (B.B.G. Handbook #68). I think that Montague Free, our Horticulturist who began the Herb Garden with the aid of Miss Elizabeth Van Brunt (still Honorary Curator) four decades ago, would be proud that the herb tradition continues strong at the Botanic Garden. ❀

MARK THE CALENDAR

If you are not currently a member of the Brooklyn Botanic Garden and would like to attend the Symposium on either June 10 or 11 honoring the 40th anniversary of the Herb Garden, please drop a line requesting details to Ms. Estelle Gerard, B.B.G., 1000 Washington Ave., Brooklyn, N. Y. 11225. Members will automatically receive information about the meeting.

In addition to the Symposium there will be special guided tours of the Herb Garden and other points of interest on the grounds, including the Fragrance Garden. The Cranford Rose Garden, America's third largest in varieties grown, should be at its peak. Besides the modern hybrid teas, floribundas and climbers, it has many old-fashioned roses that have played an important role in herbal history. We also expect the Iris Garden to be in full bloom at this time. ❀

COMING UP ROSES

Gertrude Stein once said, "A rose is a rose is a rose," but the Brooklyn Botanic Garden and its friends have never taken the genus quite so simply. Probably no ornamental plant is better known or has given more pleasure to man. The rose has always been honored at B.B.G. since the inception of the Cranford Rose Garden in 1927. This year it will have a very prominent place because the Golden Anniversary of the Cranford Garden has come. Why not plan to join us for the festivities on Wednesday, June 8? Members will receive particulars about the program, including speakers, in due course. If you are not a member but would like to attend, please drop a line to Ms. Estelle Gerard (B.B.G., 1000 Washington Ave., Brooklyn, N.Y. 11225) and she will send details of the day. 🌹

EVER-SO-SWEET CICELY

Elfs were busy this past summer collecting seed of sweet cicely (*Myrrhis odorata*) from the B.B.G. Herb Garden and an anonymous member's kitchen border in Connecticut. Do you know this striking perennial? It has attractive lacy white flowers on four-foot-tall stalks in May, and the strongly anise-scented foliage is a dead ringer for a fern. Several cut leaflets give a distinctive flavor to summer salads or cold drinks, and an unripened seed or two is refreshing to nibble on when you are doing garden chores on a warm June day. Mature seeds germinate readily in the garden but not to the point of being pesty. If you would like to try growing some, send a stamped, self-addressed, business-size envelope to the Editor, B.B.G., 1000 Washington Ave., Brooklyn, N. Y. 11225. Cultural instructions and lore will be sent with the seeds. 🌿

Sweet
cicely

Roché



SOURCES OF SEEDS

Margedant Hayakawa

Adapted from PACIFIC HORTICULTURE, October, 1976

Raising a plant from seed is often the only way to obtain it, but where can the seed be obtained? There are some commercial sources, but for the most part the large national and regional seed companies offer only the more commonly grown annuals and perennials. Few tree and shrub seeds are available. For uncommon plants the gardener must turn to the specialty sources, such as growers of primroses, say, or collectors of wildflower seeds, or to the many specialist plant societies which distribute seeds donated by their members.

The list below includes many of the plant societies here and abroad which offer seeds to members, and occasionally also to non-members. The addresses given are those to which membership applications and inquiries should be sent. Then follows the cost of an individual annual membership, the publications and other services offered, and lastly information about the kinds of seeds offered, and the charges, if known. In the case of foreign organizations, check the exchange rate at a bank or in the *Wall Street Journal*. Personal checks are usually acceptable, but add something for bank charges for currency exchange. Most, if not all, of these memberships qualify as tax deductible. Some dues are payable in January; others begin whenever the member joins.

Plant Societies

Alpine Garden Society, E. M. Upward, Secretary, Lye End Link, St. John's, Woking, Surrey GU21 1SW, England. £3. Quarterly *Bulletin*; shows; tours; slide library. Annual seed distribution lists c. 5000 items. Small charge.

American Daffodil Society, 89 Chichester Rd., New Canaan, CT 06840. \$7.50. No published lists; donated seeds distributed to members requesting them; daffodils only. Free to members.

American Fern Society, Dr. James D. Caponetti, Dept. of Botany, University of Tennessee, Knoxville, TN 37916. \$5. Quarterly *American Fern Journal*; bulletin *Fiddlehead Forum*; library; herbarium. Spore Exchange, with worldwide sources, lists c. 500 items. Small charge.

American Gloxinia and Gesneriad Society, Mrs. J. W. Rowe, Secretary, Box 174, New Milford, CT 06776. \$7. Bimonthly *The Gloxinian*; cultural handbook; library; round robins. Seed list, gesneriads only. Charge: yes. Special offer: packet of mixed seeds, sample of *Gloxinian*. 50¢.

American Gourd Society, John Stevens, Secretary, Box 274, Mount Gilead, OH 43338. \$2.50. *The Gourd*, three times a year; publications on gourd culture, uses. List of members with seeds to sell.

American Hibiscus Society, Mrs. Gordon Fore, Executive Secretary, Rt. 1, Box 491 F, Fort Myers, FL 33905. \$5. Quarterly *Seed Pod*; publications on hibiscus culture; chapters. Seed Bank, hibiscus only. Free to members.

American Horticultural Society, Mount Vernon, VA 22121. \$15. Bimonthly *American Horticulturist*, Newsletter, annual American Horticultural Congress, educational programs, tours. Annual seed

list of rare and unusual woody and herbaceous plants. c. 200 entries last list. Free to members.

American Hosta Society. Paul Aden, 980 Stanton Avenue, Baldwin, NY 11510. \$5. Annual *Bulletin*, newsletters; conventions; garden tours; plant sale. Annual seed list. Charge: yes.

American Iris Society. Missouri Botanical Garden, Clifford W. Benson, Secretary, 2315 Tower Grove Ave., St. Louis, MO 63110. \$7.50 plus \$2 to \$3 for various specialty section memberships, if desired. Quarterly *Bulletin*; checklists of registrations and introductions; round robins. Seed list through Species Iris Study Group; wild species and their hybrids only, no tall bearded cultivars; over 300 listings. Charge: 25¢ per packet.

American Penstemon Society, Howard McCready, Secretary, 1547 Monroe St., Red Bluff, CA 96080. \$3. *Bulletin*; cultural pamphlets; round robins; regional chapters; field trips. Annual seed list; penstemon only; c. 300 items; small charge.

American Primrose Society, Mrs. Thelma Genheimer, 7100 S. W. 209th, Beaverton, OR 97005. \$5. Seed list, primroses only. Charge: yes.

American Rhododendron Society, Mrs. Bernice J. Lamb, Executive Secretary, 2232 N. E. 78th Ave., Portland, OR 97213. \$12. Quarterly *Bulletin*; many chapters including groups in California, Oregon, Washington and Vancouver, B. C. Seed list; rhododendrons and azaleas, no charge to members.

American Rock Garden Society, Wm. T. Hirsch, 3 Salisbury Lane, Malvern, PA 19355. \$5. Quarterly *Bulletin*; regional chapters; study weekends; annual meetings. Seed exchange, many other species in addition to alpiners. 1975 list 3405 items. Packets 6 for \$1; 6 free to donors.

Bonsai Clubs International, 445 Blake St., Menlo Park, CA 94025. \$7.50. A

worldwide federation of bonsai clubs. Seed list, c. 50 listings in 1975; varieties suitable for bonsai. Charge: 45¢ per packet, plus mailing.

Botanical Society of South Africa, Kirstenbosch, Claremont, 7735, Cape Province, South Africa. R6. (The Rand is approximately \$1.50.) Quarterly *Veld & Flora*; lectures, shows. Annual seed list; annuals, perennials, succulents, bulbs, shrubs, trees from the National Botanic Gardens at Kirstenbosch; 1975 list included 509 items. Fifteen packets free with membership.

British Iris Society, Hon. Membership Sec'y, 38 Canonbury Park South, London N1 2JH, England. £ 3. Annual *Iris Year Book*; thrice-yearly *Newsletter*; shows. Seed list, Iridaceae, c. 250 listings. Charge: small handling charge to members; non-members may order at 25p per packet.

The Bromeliad Society, Inc., P.O. Box 3279, Santa Monica, CA 90403. \$7.50 Bimonthly *Journal*. Seed list, bromeliads; c. 50 items. Charge: yes.

California Horticultural Society, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118. \$12.50. Quarterly *Pacific Horticulture* (formerly *California Horticultural Journal*); meetings; plant sales; field trips. Annual seed distribution of uncommon shrubs, trees, bulbs, perennials, and annuals. 1975 list included 121 items. Free to members.

California Native Plant Society, 2380 Ellsworth St., Berkeley, CA 94704. \$8. Quarterly *Fremontia*, periodic *Bulletin*. Chapters, field trips. Many chapters have plant sales which sell seeds as well as plants; largest and oldest sale is that of San Francisco Bay Area Chapter in the fall.

Carnivorous Plant Newsletter, Arboretum, California State University, 800 North State College Blvd., Fullerton, CA 92634. Quarterly, \$5.00, \$7.00 overseas (airmail).

No formal organization, but seed exchange (50¢ or \$1 charge), books and other sources of information offered.

Gesneriad Society International, Mrs. Dorothy E. Thomas, Membership Secretary, 628 N. Cory St., Findlay, OH 45840. \$5.25. Bi-monthly *Gesneria—Saintpaulia News*; round robins. Seed bank offers bi-monthly listing of c. 115 items. Charge: 50¢ per packet plus stamped envelope; one packet free to new members.

Holly Society of America, Bluett C. Green, Jr., Secretary-Treasurer, 407 Fountain Green Rd., Bel Air, MD 21014. \$5. *Holly Letter; Proceedings*; other publications; slide library. Seed list currently being planned; Ilex only. Charge: postage and handling.

Indoor Light Garden Society of America, Mrs. James C. Martin, Secretary, 423 Powell Drive, Bay Village, OH 44140. \$5. Bi-monthly publication; pamphlets on propagation and culture under lights; 4000 members, 25 local chapters. Bi-monthly seed list, mostly gesneriads, plus a variety of other plants; c. 20 listings. Charge: yes.

Los Angeles International Fern Society, 2423 Burritt Ave., Redondo Beach, CA 90278. \$4.50. Monthly *Bulletin; Fern Lessons*; annual show. Monthly listing of new Spore Store offerings. 50¢ per packet.

North American Lily Society, Earl A. Holl, Box 40134, Indianapolis, IN 46240. \$7.50. Quarterly *Bulletin*; annual *Yearbook*; library; consulting service. Annual seed list, *Lilium* only. Minimal charge.

Palm Society, Mrs. T. C. Buhler, Executive Sec'y, 1320 S. Venetian Way, Miami, FL 33139. \$12.50. Quarterly *Principles*; roster of 1000 members around the world. Seed exchange includes rare and even unnamed specimens; announced as received, since seed cannot be stored. \$1 per packet.

The Royal Horticultural Society, Vincent Square, London SW1P 2PE, England. £7.50. Monthly *The Garden* (formerly the *Journal*); shows; lectures; library; tickets to Society's Wisley Garden; preview of annual Chelsea show. Annual seed distribution, 1975 list included 1160 items. 50 packets free with minimum membership.

Scottish Rock Garden Club, R.H.D. Orr, 70 High St., Haddington, East Lothian, Scotland. \$3.75. Twice yearly *Journal*. Annual seed distribution list includes c. 3000 items. 18 packets free to overseas members. Charge for postage.

Strybing Arboretum Society, Hall of Flowers, Golden Gate Park, San Francisco, CA 94122. \$15. Quarterly *Pacific Horticulture*. Lectures, classes, tours, field trips. Large annual plant sale in the spring offers many rare plants and a selection of seeds and bulbs. Pre-sale for members; second day open to the public.

West Australian Wildflower Society, P.O. Box 64, Nedlands 6009, West Australia. \$5 Aust. p.a. Quarterly newsletter. Seed bank offers c. 100 to 200 species. Small charge. Other branches of the Society for Growing Australian Plants, and possibly also offering seeds, are listed in the Society's periodical, *Australian Plants*, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213. \$4 U.S. p.a. This magazine is an indispensable source of information to anyone interested in growing Australian plants.

General Information

For those interested in Australian and South African plants, two commercial sources are important:

Nindethana, Box 129, Wellington, 2820 N.S.W., Australia.

Honingklip Nurseries, W.J. and Mrs. E. R. Middelman & Son, 13, Lady Anne Ave., Newlands, Cape, South Africa.

Hardy Plant Finder, HHH Horticultural, 68 Brooktree Rd., Hightstown, N.J. 08520. \$2; and the same publisher's *Tender Plant Finder*, \$2.25, list some general and specialty commercial seed sources, as well as specialty nurseries and other horticultural addresses.

The Seedlist Handbook, by Bernard Harkness, Kashong Publications, Box 90, Bellona, NY 14415, 2nd ed., 1976. \$5. This extraordinarily valuable work is intended as a guide especially to the seed lists of the three American and British rock garden societies listed

above. It lists more than 10,000 species and cultivars of plants, including trees and shrubs, with brief description of each, height, flower color, country of origin, and so on. So if you are trying to decide whether it is *Geranium renardii* or *G. endressii* you'd like to order, you can be saved a search through *Hortus* and a stack of other books. It also sorts out synonyms. "How many would recognize *Saxifraga symons-jeunii* to be *S. longifolia* 'Tumbling Waters'?" the author asked in the original preface. In addition there are citations to more than 150 books and other sources of information, making this a truly useful reference work to own. ❧

THE BEST OF THE YEW

L. C. Chadwick and R. A. Keen

Adapted from *A Study of the Genus Taxus* published by the Ohio Agricultural Research and Development Center, 1976

In American gardens the yews (*Taxus*) have always been associated with quality. Their predominantly foreign origin, moderate growth rate and limited supply restricted their use to the estates of the wealthy. The few mature specimens in America today are to be found in the antebellum plantation gardens and cemeteries of the South, and on the grounds of the rapidly disappearing estates on Long Island and near Boston and other large cities on the Eastern Seaboard.

With the adoption of Quarantine 37 in 1918 which prevented the importation of nursery stock, the nurserymen of America were forced to start propagating evergreens. In order to meet the demand of the public for quality evergreens, the yews were propagated from almost any available source. Cuttings were taken from local estates, park plantings and nursery plants. Seed was collected from mixed plantings anywhere. The resulting

plants were usually salable, although they were well described as "mongrels." The less scrupulous nurserymen would supply a name, or worse, market the plants to a gullible public under some name which had current demand. The confusion of names resulting from such practices presented taxonomic difficulties of the genus which still exist today.

The cultivars of the English yew (*Taxus baccata*) have been produced over a period of centuries. Their introduction, evaluation and description have been slow and more or less orderly because of the time involved and the single species as a source.

By contrast, the Japanese yew (*Taxus cuspidata*) was brought to America a little more than a century ago (1862) and *Taxus media* (*baccata* x *cuspidata*) was introduced about 1920. Since then many cultivars of these two species and their hybrids have found their way into the trade, often with few records kept as to origin



Both photos;
L.C. Chadwick

The unpruned Hatfield yew (*Taxus media* 'Hatfieldii'), left, shows the full-based habit that makes it a better hedge plant than the Hicks yew (*T. m.* 'Hicksii'), below.

of this genus and to classify, name and describe the yews in the American horticultural trade as far as practicable.

The first plants were received and set out in May, 1942. They were planted in groups of mostly five of a kind, from a single source if possible. Additional yews and replacements, where needed, were planted each season as received. In order that all of these plants might exhibit their natural growth habit, trimming or pruning has been held to a minimum.

The present planting includes 97 accessions. Many of the "named" accessions in the collection at one time or another during the past 34 years have been found to be synonymous with previously named cultivars. Others have died due to unfavorable cultural conditions, or have been removed due to severe winter injury. Some 141 accessions have been received.

During the years the project has been in progress, the senior author has prepared periodic lists of recommended *Taxus*. Changes have been constantly made as additional data were accumulated and observations were made. Any list of this nature must be flexible. New cultivars, some superior to existing types, will continue to be introduced.

The earlier lists were compiled on the basis of limited observations and on catalog or other descriptions. With age, growth habits of several cultivars have markedly changed, and as they matured they varied greatly from early catalog descriptions. As an example, *Taxus cuspidata* 'Adams' was described and introduced as a narrow, upright cultivar. When not restricted by constant pruning, specimens planted in 1942 in the *Taxus* plantation now measure 13 to 14 feet in height with a spread of 25 to 27 feet.

Criteria

The following list of recommended cultivars is based on the authors' current ob-

and without a clearly defined description of the introduction.

Taxus Project

The Living Herbarium of *Taxus*, a part of the Secrest Arboretum at the Ohio Agricultural Research and Development Center, Wooster, was established jointly by the Ohio Nurserymen's Association and the Ohio Agricultural Experiment Station (now the Ohio Agricultural Research and Development Center) in 1942 for the purpose of studying the taxonomy



George S. Avery

"Dwarf" weeping English yew (*Taxus baccata* 'Dovastoniana') at Studley Castle, England, was planted about 1830. Its circumference now exceeds 300 feet; its height, 28 feet.

servations. It should be particularly helpful in satisfying the requirements of various landscape designs. Such factors as size, growth habit, hardiness, foliage, and fruiting characteristics were considered. Concerning the last point, it should be remarked that the yews are usually dioecious and pistillate (female) plants bear attractive red berry-like fruits when pollinated by a staminate (male) plant. The *Taxus media* cultivars 'Andorra', 'Hicksii' and 'Kelseyi' have been the heaviest bearers at the Secret Arboretum over the years, although fruiting is better in some years than others.

There is no basis for growing a long list of cultivars. Select the best. Choices from the recommended list ought to be made in part on regional climatic conditions. *Taxus baccata* is not dependably winter hardy much north of New York City, although the distinctive cultivar 'Repandens' can be grown safely in eastern Massachusetts and similar areas. *Taxus cuspidata* and *T. media* are generally tolerant of colder winters (to -20° F). Good

drainage, especially in winter, is important for all yews.

Although the recommended cultivars are based on size and general habit of growth, these factors cannot be exact. Dimensions may be exceeded and growth habits may vary somewhat from those specified.

Some Recommended *Taxus*

Note: * denotes a female cultivar

Small Types, 1-5 Feet

Low, Spreading Types

Taxus baccata 'Repandens'*

Taxus media 'Chadwick'*

Taxus media 'Everlow'

Slow Growing, Compact, Rounded Types

Taxus cuspidata 'Densa'*

Taxus media 'Newport'*

Slow Growing, Horizontal Spreading Types

Taxus cuspidata 'Nana'



Japanese yew growing since 1918 at Planting Fields Arboretum, Oyster Bay, N.Y. Several years ago the lower branches were removed and a characterless large ever-green shrub became a striking multistemmed tree. Few basal shoots or sprouts have appeared since the heavy pruning.

Medium Types, 6-10 Feet

Slow Growing, Compact or Rounded Types

Taxus baccata 'Adpressa'*

Taxus media 'Emerald'*

Compact, Broadly Rounded Types, Broader Than High

Taxus media 'Amherst' (usually male)

Taxus media 'Brownii'

Taxus media 'Densiformis'

Taxus media 'Moon'*

Compact, Spreading Types

Taxus media 'Berryhill'*

Taxus media 'Flemer' (male or female)

Taxus media 'Natorp'*

Taxus media 'Sebian'

Taxus media 'Wardii'*

Narrow, Upright Types

Taxus media 'Flushing'*

Taxus media 'Grandifolia'

Taxus media 'Sentinalis'*

Large Types, 10 Feet or More

Compact, Rounded, Broad as High

Taxus media 'Lodi'

Taxus media 'Ohio Globe'

Compact, Broadly Rounded Types, Twice as Broad as High

Taxus media 'Dutweilleri' (usually male)

Taxus media 'Halloriana'*

Taxus media 'Henryi'

Taxus media 'Runyan'

Taxus media 'Vermeulen'*

Broad, Pyramidal Types

Taxus baccata 'Dovastoniana'

Taxus cuspidata 'Capitata' (male or female)

Taxus media 'Hatfieldii'

Taxus media 'Hill'

Taxus media 'Kelseyi'*

Broad, Upright, Spreading Types

Taxus cuspidata 'Adams'

Taxus cuspidata 'Thayerae'*

Taxus media 'Wellesleyana'

Broad, Columnar Types

Taxus media 'Costich'

Taxus media 'Hicksii'*

Taxus media 'Stovekenii'

Tree Wound Paint: Healing Aid or Bandaid?

When you remove a tree limb, you paint the wound to hasten the healing, right? Not always, according to Dr. Alex L. Shigo, Chief Plant Pathologist at the USDA Forest Service's North Eastern Forest Experiment Station at Durham, N.H. Dr. Shigo has conducted extensive experiments to determine how trees heal themselves and what benefit, if any, was realized if the wounds were painted. His findings from these studies have shown that virtually every tree suffers some natural injury during its lifetime and that almost all wounds heal without decay.

A tree's natural healing process is a twofold response involving both external closure and internal compartmentalization, with the latter being by far the more important process. While not visually apparent, the internal mobilization of chemical and mechanical barriers in response to wounding usually prevents or fights off the invasion of disease microorganisms. If, however, decay should overcome the initial defense responses, it may then be contained or compartmentalized in a narrow column within the tree where its spread into new, healthy wood is prevented. Consequently, a wound does not necessarily have to externally close or callus over for the tree to be healed.

With this preliminary knowledge, Dr. Shigo launched an experiment in 1970 to determine the value of wound dressings. After deliberately wounding one hundred red maples and American elms, he painted three-quarters of the wounds with various commonly available dressings; the remainder were left untreated for comparison. Several years later the results indicated that, while some dressings, especially those with lanolin bases, might stimulate external callus formation, the commonly used wound dressings, especially those with an asphalt base, did little or nothing to stop internal decay caused by disease microorganisms. Thick coatings of dressing could, in fact, even assist the disease process by providing favorable sites in the bubbles for growth and reproduction of decay-causing organisms.

While the research results indicate that wound dressings are more a cosmetic than a treatment or cure, Dr. Shigo makes several alternative recommendations for treatment of an injured tree. These include such methods for increasing tree vigor as watering, fertilizing, cutting down nearby trees and plants of little value to reduce competition and, if necessary, additional pruning of the injured tree. Also important is the removal of injured bark and cutting the bark back, in the shape of a vertical ellipse, to healthy tissue. Even though this may enlarge the wound, cutting back eliminates the disease and insects present in the dead bark and gives the healthy tissue a better chance to heal successfully. (The last step, if you still feel uneasy about an open wound, is to lightly paint it with a non-asphalt dressing.)

Dr. Shigo's faith in a tree's own healing ability, especially if vigor is increased and wounds are properly trimmed, can be summed up in a phrase that recurs in many of his articles:

"If most wounds didn't heal by themselves, we wouldn't have any trees." ❧

If other evergreens fail, here is . . .

A EUONYMUS FOR TROUBLE SPOTS

Robert G. Titus

With the passage of time all gardens, large or small, develop problem areas. For example, the original evergreen shrub plantings near or under trees may begin to thin out, lose their lower branches, and grow tall and leggy. This effect is evident not only during the summer season but even more so in winter. Pruning, extra fertilizing and watering may produce good short-term results, but additional underplanting or replacement must eventually be considered. Shade and root competition of trees are real problems that seem to defy the best efforts of the home gardener as well as the skilled plantsman.

Long Island Experiment

The entrance drive at Planting Fields Arboretum near Oyster Bay, New York, is bordered by mature plantings of hybrid rhododendrons under fine old specimens of European beech (*Fagus sylvatica*), a tree noted for its ability at maturity to starve all nearby vegetation. This can be one of the roughest planting situations imaginable.

As the rhododendrons began to decline, test plantings of Japanese pieris (*P. japonica*), drooping leucothoe (*L. fontanesiana*), rosebay rhododendron (*R. maximum*) and English holly (*Ilex aquifolium*) were made. These evergreens were successful where some sunlight filtered through the trees. In dense shade, on the north side of the beech trees, only small-leaved forms of English ivy (*Hedera helix*) survived.

Seven years ago a group of spreading euonymus (*E. kiautschovica*) was set out 6 to 8 feet apart in the problem site. Soil preparation included the thorough incorporation of peat moss and superphosphate, followed by a top dressing of 5-10-5 fertilizer and a mulch of wood chips 3 inches deep.

As a result of this and subsequent plantings, we now find ourselves extolling the virtues of spreading euonymus. It is one of the best shrubs for gardeners faced with the double problem of tree shade and root competition.

Scale insects, aphids and other pests attack many species of euonymus in various parts of the country, but gardeners should take comfort in knowing that *E. kiautschovica* has been pest free at Planting Fields Arboretum and at the Brooklyn Botanic Garden. Another point to remember: if a number of plants are required, spreading euonymus roots from cuttings almost as easily as English ivy and can be a real "economy" plant in the home garden. Perhaps its low cost, in addition to wide adaptability, is why this shrub has been increasingly planted in parks of New York and other large cities.

Spreading euonymus is not a new plant in the United States. Credit for its introduction probably goes to George R. Hall, M.D., an American missionary who upon his return from Japan in 1862 delivered a large consignment of plants and seeds to the famed old Parsons Nursery of Flushing, New York. This was one of the biggest hauls in the history of American horticulture. Besides the spreading euonymus, it included many other apparent introductions to this country, among them star magnolia, peegee hydrangea, Hinoki and Sawara false-cypresses—and Hall's Japanese honeysuckle, which southerners in particular may not appreciate because of its twine-and-choke invasion of hedge rows and old fields.

Euonymus kiautschovica, which is native to eastern and central China, is often sold in the nursery trade under a more easily pronounced but incorrect name, *E. patens*. Several cultivars or hybrids, including 'Dupont', 'Manhattan' and 'Vincifolia', have been reported.



Joann Knapp/Planting Fields Arboretum

Spreading euonymus (*E. kiautschovica*) solves a problem at Planting Fields Arboretum, Oyster Bay, New York. Few shrub can stand the dense shade and root competition of old beech trees.

For Sun or Shade

When we at Planting Fields planted spreading euonymus in a sunny location, it developed strong upright branches and in 10 years reached a height of 10 feet with a spread of 12 feet. The shrub remained evergreen during most winters, which here average $+5^{\circ}$ to -5° F. Farther north it is apt to be deciduous. Spreading euonymus is winter hardy to coastal Massachusetts (Zone 6, Arnold Arboretum map).

In shaded areas the branching habit tends to be arching and spreading. Leaves too seem a bit larger and glossier. During a 7-year period plants have reached a height of 4 to 5 feet and a spread of 6 feet. The leaves are opposite and glossy green, resembling those of the closely related but more tender *Euonymus japonica*, which has a slightly thicker foliage texture. The leaves of spreading euonymus are 2 to 3 inches long and have wavy toothed margins. The flowers are small and green and not at all

conspicuous, but they develop into pink capsular fruits enclosing orange arils. These mature in October and November and are quite showy. If they look a bit like bittersweet don't be surprised, for *Euonymus* is a member of the larger plant family known as the Celastraceae.

Euonymus kiautschovica, even though thriving in dense shade, does equally well in hot sunny situations near roads or at the seashore. With light pruning or shearing it also makes a dense and beautiful hedge. In exposed windy locations, such as near the shore of Long Island Sound, leaves do suffer winter injury. New growth starts early in spring, however, and the plants are soon clothed again in glossy foliage.

Although not a garden beauty possessing outstanding blossoms or large fruit that is conspicuous from far away, this low-cost utility plant can help you cope with tree covered, dense shade situations. And that is a service few shrubs can render. ❧

CACTUS RUSTLERS CAUSE THORNY PROBLEMS

William M. Abrams

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To most people in more benighted sections of the country, a cactus is just something you don't want to back into. In Arizona, however, the spiny desert plants have an almost mystical significance, particularly the giant saguaro (pronounced sah-WAR-oh), known botanically as *Carnegiea gigantea*. This majestic plant, with its fluted, candelabra-like arms and height that can exceed 40 or 50 feet, is the state flower and an enduring symbol of the Old West that Arizonans hold so dear.

So it is distressing to many here that a gang of varmints is messing with the saguaros. The men in the black hats include land developers, who are bulldozing thousands of them to make way for tract homes and shopping centers, ranching and mining operators, and a growing

band of cactus thieves.

The latter are particularly active now because the saguaro has become a favored decorative plant in Arizona and other states, as well as abroad. The Japanese apparently are crazy about saguaros, and the cacti sometimes sell for \$40 a foot in Japan. Even locally, home gardeners will pay \$10 a foot for a saguaro.

Consequently, a lot of people in Jeeps, pickup trucks and cars are prowling around the desert, digging up cacti and selling them. In Arizona, that's a crime most foul. A 1929 Native Plant Law protects over 200 types of plants and trees, allowing their removal only with permission of Arizona's Commission of Agriculture and Horticulture, which issues permits and tags for the plants. Saguaro tags are \$2 each; other tags are \$1.

Cactus Cops

The penalties are stiff. Thieves caught with hot cacti can be fined up to \$300 per plant and thrown into jail for up to 90 days. Some cactus-loving judges aren't shy about issuing sentences, either. One thief from Surprise, Arizona, was found with just seven small untagged plants hidden beneath \$1,000 worth of tagged

Desert Botanical Garden



The young *Myrtillocactus* in the foreground is, unfortunately, the perfect size for plantnappers.

This saguaro (*Carnegiea gigantea*) is probably over 150 years old. If their seedlings are repeatedly stolen, the saguaros are in danger of extinction.

ones; he got the full 90 days.

The thieves are undeterred, however. "Cactus theft is as profitable as cattle rustling used to be," says Richard A. Countryman, who heads the state's four-man corps of cactus cops. They bounce into the boondocks looking for illegal harvesters, inspect nurseries for untagged stock and prowling shopping-center parking lots, where thieves often peddle their goods.

Some of the miscreants are big-time operators. One was caught with 357 plants, 110 of them saguaros, hidden under a false floor in a pickup truck innocently loaded with wood. Others are bunglers, like the chap who was stopped by the cops for a noisy muffler, reached into a pocket for identification, and stabbed himself on a needle from a hot saguaro.

Mr. Countryman, a burly, 23-year veteran on the cactus beat, says the job isn't easy. He's had to calm two thieves who drew guns on him, and he always wears a revolver and carries a shotgun in his truck. "We've got tough boys in this business," he says ominously. "They could bury you out in that desert and no one would find you for months."

He gets frequent threats, including one from an irate nursery owner who allegedly asked, "Do you know what a contract is? I've got friends in Chicago." Mr. Countryman answers harassing phone calls with an ear-splitting blast from a police whistle into the mouthpiece.

The cactus cops have to live with the frustrating knowledge that most thieves are never caught. Only 31 were arrested last fiscal year, a number believed to be only a fraction of the total number operating. These authorities also have to take a lot of flak from those who do get caught. Recently, for example, when they hauled



Brooklyn Botanic Garden

off a load of illegal cacti from a home in a retirement community, outraged senior citizens gathered to jeer at the law enforcers.

A Law With Mixed Benefits

William Green, owner of the nursery Arizona Growers, says that Mr. Countryman's employer, the state, is itself the major violator—at least in spirit—of the plant law because it allows the wholesale destruction of native plants on public land.

Under the law, miners, ranchers and others leasing public land, of which more than half the state is comprised, can't sell or even give away a protected plant to a private citizen or business. But the law says nothing about destroying plants. Rather than choose the expensive option of moving cacti to other state property,

individuals and companies operating on public lands bulldoze, dynamite or flood thousands of cacti. At an Asarco Inc. mine near Tucson, for example, hundreds of saguaro-covered acres were recently drowned during construction of a tailings pond. "It would have been best to have a commercial operation take the plants away, but the law makes it impossible," says an Asarco agronomist.

Dwindling Saguaro

The saguaro population has been in a long decline. Cattle, introduced in the 1880's, began the destruction, and increasing aridity is further thinning the population. "The good years, the years in which there's enough moisture so that large numbers of seedlings can survive, are coming a little farther apart," says Robert Perrill, a biologist at the Arizona-Sonora Desert Museum. The thieves take mainly young saguaro that are the breeding stock of the future. (It's hard to move a 50-foot cactus weighing several tons, much less hide or sell it.)

Carnegiea gigantea has a delicate and

complex reproductive cycle. The flowers—which are open for less than a full day—invite the white-winged dove, which buries its head in them to get the nectar and emerges dusted with pollen that it then transfers to another plant. The plant must have just the right amount of moisture and the right soil and sun conditions to sprout and grow past the critical seedling stage.

Growth is very slow, about an inch a year for young cacti. Specimens topping 40 or 50 feet may be 150 to 200 years old. Those plants that do make it to maturity become an important part of the desert ecosystem, providing homes for desert birds and helping to knit together the soil with a wide-spread root system.

Though the saguaro's numbers are dwindling, cactus experts see no danger as yet that the plant will disappear from its Sonora Desert habitat. They warn, however, that the plant law, imperfect as it may be, is necessary to the saguaro's continued survival. "They'd be depleted in about 30 years if not protected," says W. Hubert Earle, director emeritus of the Desert Botanical Garden of Arizona. ❧

Is the green backlash coming to . . .

BOOMING HOUSE PLANTS

Dallas C. Galvin

For a person raised in Texas and Colorado as I had been, New York in 1969 was a desert. Maybe worse. Whatever greenery existed was enclosed by stone walls, such as Central Park, or curried and combed and packed with life-thirsty visitors, like the pocket parks, the zoo or the sculpture garden at the Museum of Modern Art. Indoors, apartment dwellers would point with evident pride to lone, scraggly weeds snuggled up against windowpanes, and this newcomer to the city, familiar with great aspen woods, mountains cloaked in spring flowers, citrus orchards and vast truck farms, would grimace.

Pathetic: imported outdoors. Imported gardens to hold the city's gray concrete at bay. In 1969 I shook my head and swore I'd never keep plants in an apartment. Nature is big and wild and filled with bugs and birds and myriad varieties of plants growing everywhich way. No, not for me those measly imitations on a sunless windowsill.

By 1971 my New York apartment was competition for the Jungle Jim series, and I had become an expert in begonias, bromeliads and dwarf banana plants. My windows were banked with green—trying to hold the city's grayness at bay. At the time, being queen of a jungle was not held

in sufficient esteem, so only good friends were privy to my green secret.

Two years later, even the ten-cent store was loaded with pachysandra and coleus, bat manure and aphid poisons, and all the restaurants that made the slightest claim to the back-to-nature or the hip-youth trade sported hanging ivies in every available space. By the end of 1976: the windows of City Hall were banked with plants; Jerry Baker was giving up-to-the-minute tips on windowsill eggplant cultivation and the wonders of Charlie Chlorophyll on New York Telephone's Dial-a-Plant; and the moving man, a burly cigar-chomper, not only knew the difference by name between schefflera and spider-plant, but he considered himself an expert on begonias, bromeliads and dwarf banana plants. So much for green secrets.

Popularity and its Problems

My own experience in the concrete desert, however, was happening simultaneously across the United States and in Europe, too. It is estimated that 35 million or over half the households in the United States acquired indoor plants last year. Even sunny California, where backyards and more-or-less natural flora and fauna abound, reported that 76 per cent of the state's households either bought or were given *indoor* plants last year at a total expenditure of some \$162 million, retail.

Indoor plants became a high-growth industry during the early 1970's. In fact, since the mid-sixties when wholesale plant sales averaged \$14 million per year, plant sales have risen to \$260 million last year. Growth was so spectacular that one company had sales in 1975 which were greater than total sales in 1971 for the whole industry.

One problem with such rapidfire growth is that many consumers have little or no knowledge of horticulture and the plant sellers have not provided it nor have they always provided plants acclimated to normal household conditions after leaving the greenhouse. This has led to some bizarre examples of plant abuse by thwarted green thumbs.

Last year a young, mild-mannered, apparently successful man entered an exotic plant store in mid-Manhattan and went on a rampage, furiously attacking all the plants he could and wreaking thousands of dollars in damage. The apparent cause of the man's wrath was frustration with his own plants.

This is the key, says Alex Theofanis, owner of Columbia Garden on Amsterdam Avenue, to why the plant boom may well be tapering off. "So many people come in," he said, "and I tell them 'you can't buy that plant unless you've got lots of light, lots of sunshine.' But they buy the plant anyway, and in a month they're back having problems. Or they say they don't want plants anymore. But they shouldn't have started out with those tropicals that really need hothouse care. So, of course, some people are going to stop trying to raise plants, and the fad will end."

Trouble Coming?

A spot check of area florists showed that Christmas plant sales were down slightly from last year, as of two weeks before Christmas. Some florists thought the slump might be temporary and that people would make up the difference in the week before Christmas, but many other florists were seriously concerned; they've increased their own supplies of plants, occasionally even increased their greenhouses, and, since owners of these firms operate on a slight profit margin, a downturn in the market, even a small one, can make a big difference.

A survey of florist-shop patrons and other plant enthusiasts drew an unexpectedly grim response. Many people (particularly women) who have been successful and have invested much time and energy in plant cultivation, especially of foliage tropicals, are now slowly decreasing their jungles. As remarked one biochemist from the Ford Foundation who had just given away her entire 75-plant bromeliad collection: "It's a relief. I liked my plants, but I'm tired of them. I hated the spider-plant—you can have that—and the bromeliads are just predictable to me now. I'd rather go to the

tropics and see them growing there."

Has she come to prefer cut flowers? Yes, but, "actually," she said, "I'm just tired of the whole thing. I liked plants because they didn't talk back, they aren't demanding. I thought they didn't require as much care as animals, but I was wrong. They do take care, and I don't want to take care of anything for a while. Just give me a rest!"

Overall, florists and horticulturists con-

tinue to feel optimistic. They feel the plant craze is but part and parcel of the back-to-the-earth, back-to-nature, back-to-the-senses movements and the other end of the pendulum's swing from the industrial revolution. As such, the current boom may stabilize as new and more 'interesting' plants become available to try out and as the public becomes more thoroughly versed in the techniques of indoor gardening. ♣

PLANTING TOMATOES HORIZONTALLY

Richard G. Walter

Tradition-minded gardening friends who see my newly set out tomato plants in May regard them—and me—with curiosity. The doubtful glances have nothing directly to do with planting time, since the last frosts here in northern New Jersey have about passed by then. Rather, the looks are because my way of treating tomatoes is a little unorthodox. You see, I plant them horizontally. The skepticism of my friends gives way to admiration in midsummer when they see that I have the healthiest, most vigorous tomatoes around. More important, the yield is bountiful.

Here's how it works. I make a very shallow furrow in the soil, just 2 or 3 inches deep, and set the plants out almost on their sides. I then cover the lower parts lightly with soil so that about two-thirds of the stem, including foliage along it, is buried. Plants 15 to 25 inches tall are ideal to work with, and it doesn't matter if they are spindly or leggy. By the next day the exposed stem will bend to the normal upright position.

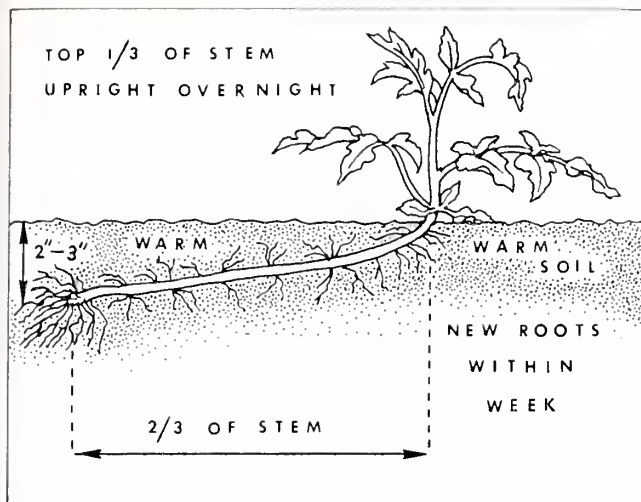
There are sound advantages in this planting method. Tomatoes make active growth only in warm soil, but at the normal spring planting time in many parts of the northern United States the soil is still

quite cool. Conventional upright planting tends to place the root system or root ball into the deeper, cooler soil, or what I like to call the icebox. This causes a setback in growth at a time when plants should be getting a fast start.

Keeping the roots within 3 inches of the surface where the soil warms quickly makes the difference. Bear in mind, too, that tomatoes are shallow-rooted plants and the better aeration that occurs with near-surface planting benefits growth. Mulching after the soil has thoroughly warmed up helps, as does the light application then of a complete fertilizer (but not one excessively high in nitrogen).

By far the greatest advantage of shallow planting comes from the encouragement of a much larger root system. Within a week of planting, new roots begin to sprout along the entire length of the buried stem. Because the soil conditions are better, they grow quickly and result in better, more productive plants. As with other plants, I like to give a starter solution as a first watering using a very diluted liquid fertilizer. This is repeated in two weeks if regrowth lags.

Shortly after planting I place 5-foot tall wire cages or cylinders (diameter 16



Eva Melady

How to horizontally set out a young tomato plant.

inches) around each tomato plant. They can be improvised from standard fence wire or reinforcing wire mesh provided the openings between the wire are 4 to 6 inches wide to allow easy picking of the fruit. (If only narrower mesh is available cut a few larger openings.) The wire cage

has to be secured with a stake. I use one for every fourth cage and connect the cages with strong sisal twine. My method reduces labor considerably because no individual plant staking, tying or pruning is necessary. It also increases the yield per plant. ❀

Richard G. Walter



Placing 5 foot wire cylinders around the plants eliminates staking and improves the yield.

Green-fingered detectives are discovering that . . .

PLANTS HAVE FINGERPRINTS, TOO

Ann Reilly

Can you distinguish between the many cultivars of creeping juniper (*Juniperus horizontalis*) or between the roses 'Toro' and 'Uncle Joe'? Don't feel badly if you can't, for you are not alone; most plant experts, nurserymen and botanists—including taxonomists—cannot face that challenge.

Visual means of plant identification is difficult and not totally reliable regardless of whether a hand lens or microscope is employed because so many cultivars within a species look so much alike, even when growing side by side. When similar cultivars are grown separately, environmental factors causing differences in growth rates, habits and foliage appearance make identification still harder.

Good news, however, seems to be on the horizon. There is research being conducted across the country now that may perfect a method enabling scientists to accurately identify and distinguish one cultivar from another by chemical methods. The term that has been coined for this identification process is plant fingerprinting.

Benefits to All

The research began in 1974. It is, financially supported by the members of the National Association of Plant Patent Owners and administered by the Horticultural Research Institute. Many people in the nursery industry are interested in this research from a strictly legal standpoint. The positive identification of plant cultivars is highly desirable because of the development of breeders' rights through plant patents and plant protection acts. However, the impact and importance of plant fingerprinting does not stop there.

It does happen, hard as most nurserymen try to prevent it, that plants get mixed up or mislabeled during propagation and growing. This can spell disaster with a capital D. Consider the orchard owner who puts in a new planting of apple trees, cares for it, waits the ten years necessary for a good crop, and then discovers he is growing the wrong variety. Fingerprinting could have prevented his loss, which does take its toll on the consumer in the long run.

Work has been done with the grains (barley, wheat, oats, rye) to determine seed purity using plant fingerprinting techniques—a potential asset for the farmer and consequently the consumer. Botanic gardens may eventually use plant fingerprinting to positively identify unknown specimens, either on their grounds or at the request of the public. Fingerprinting can also be important in breeding work for it may determine if a new seedling is in truth a hybrid. Last but certainly not least, the home gardener can be assured that what he is buying and planting is really what he wants and that it is labeled accurately.

Methods

Plant fingerprinting research is following several paths. One researcher is centering on analysis of protein, which is found in all living material. In a method known as electrophoresis, protein is extracted from a plant, applied to a gel in a test tube and then subjected to an electric current. The proteins separate into distinct bands; each plant that has different protein content and concentration will exhibit different banding, hence making possible a positive identification.

A second method employs monoter-

penes, which are chemical substances (oils) found in plants. These are extracted and analyzed by gas chromatography. The presence of various monoterpenes and their concentration in the particular plant vary with the cultivar. With the use of this method 54 out of 55 different cultivars of *Juniperus horizontalis* can be positively distinguished. Many types of plant material have been studied, including grasses, grains, vegetables, fruits,

roses and other ornamentals. The results are very encouraging although much still remains to be done.

The short-run objective of plant fingerprinting is to establish a reliable, quick, inexpensive test which will tell if plant A is identical with or different from plant B. The long-run objective is to build up a fingerprint record of each important horticultural clone for future identification reference. ❧

Eva Melady



"You, sir, are an imposter! I am the Crimson King maple!"

A leading student of plant names discusses his . . .

THOUGHTS ON *HORTUS THIRD*

Benjamin Blackburn

The appearance of a book as keenly anticipated as the new *Hortus* from the Liberty Hyde Bailey Hortorium at Cornell is an event of signal importance for gardeners everywhere. This new work also becomes a valuable reference for botanists, far above its two predecessor volumes, for all the 20,397 kinds of plants described have their botanical authorship noted in the accepted way. This detail alone must have vastly increased the time required to produce the work and it is believed and hoped that these records will simplify the groundwork for a new edition of *The Standard Cyclopedia of Horticulture*.

One of the gratifying features of *Hortus Third* is the meaningful and traditional spelling of scientific names, with capital initials for the specific epithets when appropriate. Dr. Bailey himself once said it was giving scant honor to the distinguished people for whom many plants are named to "decapitate them." This nicety of treatment is optional under the botanical rules.

Write-ups on pertinent topics are informative and excellent: that on Plant Registration offers a fine example of their lucid treatment. Another generally helpful feature is the addition of hardiness zones indicating the area farthest north in which many plants can be expected to grow outdoors satisfactorily, keyed to attractive end-paper maps. Quite a few of the zone listings require extension northward. A number of bamboos listed for Zones 7 and 8 grow vigorously and even rampantly much farther north; *Actinidia chinensis*, *Elaeagnus pungens*, *Halesia diptera*, *Tetrapanax*, *Trochodendron* and quite a good assemblage of others can be rewarding subjects at least into Zone 6.

However, a Chinese tallow-tree (*Sapium sebiferum*) surviving outdoors in Zone 4 would be a curiosity indeed.

Taxonomic positions taken in the work seem admirable for the most part. One is grateful to see *Cornus* presented in its long-accepted togetherness. Many long-outdated synonyms are noted, and this pattern has greatly lengthened the book to dubious advantage. A few words in the generic descriptions could have obviated any need to maintain the space-consuming synonyms in the *Malus/Pyrus/Sorbus* conflict, as well as the *Azalea/Rhododendron* overthrow, half a century and more in botanical history.

Minor points may draw attention, but in page after page of meticulous work these seem comparatively insignificant. Repetition makes one conscious of the phrase "listed name of no botanical standing," as for *Magnolia* selections and many, many others. This comes to seem a carping and petulant complaint, in addition to making countless entries run to an additional line and increasing production costs of the book. One cannot escape the feeling that any naming of plants has some degree of botanical standing, be it valid and correct, minimal and illegitimate, or some degree in between—all of which may be viewed differently a few years hence. The phrase "listed name" is used sparingly; this seems adequate.

The mention of *Magnolia* may be unfortunate, as entries for this favorite reflect problems. In 1779 a writer on recently discovered plants published names for two beautiful Chinese exotics—Yulan and lily-flowered magnolias. He did not call them *Magnolia*, but *Lassonia*, and his fragmentary references were so ambiguous that in his meticulous *Bibliography of*



S. Goldberg/Cornell Univ.

"My life has been a continuous fulfillment of dreams." So said Dr. Liberty Hyde Bailey, April 29, 1948, at a dinner at Cornell marking his 90th birthday. He had passed that day, March 19th, alone on an island in the Caribbean, finding three palms never before described by man. They and other specimens were added to the collection of 200,000 plants at the Bailey Hortorium, the unique botanical institution which Bailey founded in 1913 after retiring as Dean of the College of Agriculture at Cornell.

Dr. Bailey is shown here, before the dinner, receiving the Johnny Appleseed Memorial Medal from the Men's Garden Club of America for meritorious service in horticulture.

Cultivated Trees and Shrubs, Alfred Rehder of the Arnold Arboretum dismissed them as "inadequate and erroneous descriptions." A British botanist had seen fit to revive the *Lassonia* specifics in 1934; Rehder noted this, but made no change in his evaluating the names as unacceptable under the rules of nomenclature. Rehder's range of knowledge of the entire field of woody plants was unique and unsurpassed, and we seem immature indeed if we feel it can be superseded even now in a case with no new materials nor evidence producing a changed picture. The names *Magnolia denudata* for Yulan and *M. liliflora* for lily magnolia

should remain valid, and it is hoped that horticulturists will not accept innovations.

A few minor points may be noted: Under *M. officinalis*, the spice magnolia of China, *biloba*, is a leaf-form of minor importance, but usually coming true from seeds, and definitely not a cultivar. In this genus alone, nine lines of space are used to accommodate the plaint "listed name of no botanical standing"—which might advisedly be applied to *M. kewensis*, but is not. Star magnolia is maintained in unnatural isolation, and not appended to the species from which it supposedly derives and which its seedlings

turn out to be, *M. Kobus*.

Scant attention to modern treatments is reflected in nearly six columns of type for *Salix*, the willows. Rokkakudo, of Japanese gardens and of unknown origin, named *Salix elegantissima* by the German botanist Karl Koch, may well be a hybrid of *S. babylonica* and *S. matsudana*; anyone who knows this beautiful tree is not willing to see it submerged as a synonym of the former. Then, the weeping golden-branched selections so deservedly popular are properly classed as *S. x chrysocoma* Dode.

It is an error to eliminate the botanical status of Cypress oak, as well as to ignore this common name established in at least three languages in Europe (and moreover, a tree which habitués of the Ithaca locale should view as an old friend). *Quercus Robur* forma *fastigiata* (Lamarck) Schwarz is a natural habit variant of the widely distributed common oak of Europe, collected by de Candolle from wild specimens in the Pyrenees and well documented for central Europe also. If horticulturists need special names for selections of Cypress oaks propagated vegetatively, these should be described.

It is erroneous to change the original spelling of *Cephalotaxus Fortunei* and *Juglans ailantifolia*. As in the case of *Wisteria*, the authors were competent scholars and they spelled the specifics as they wished them to be spelled. The director of the Royal Botanic Gardens, Kew, postulated a masculine noun *Fortunus* and Carrière quite naturally preferred the French spelling *Ailantus*. *Wisteria* is not "corrected" in *Hortus Third* fortunately, but such restraints can be carried too far. A work reflecting the prestige of the Liberty Hyde Bailey Hortorium might have rejected gauche and meaningless *Ginkgo* (Kaempfer's error perpetuated by Linnaeus), and approved the one-letter change to easily acceptable *Ginkyo* (Ginkyo, silver almond), but this wasn't done.

Purported corrections in Latin spellings have been made, especially in adjectival endings for memorialized proper names ending in *er*. Thus, we read *Englerana*,

Pfitzerana and so on. This opposes established usage and seems controversial (as well as out-of-character for scholars who could accept the ungrammatical title for the book which engrossed them for so many years—*Hortus Tertius* might have seemed too pedantic for America, it is true, but *Hortus III* should have solved the fault painlessly).

A feature which should prove a convenience is a separate index for common names. One or occasionally two acceptable and honest common names for a plant should be enough, but in perusing a few columns in *Hortus Third*, one begins to suspect that the listing of supposed common names has gone entirely too far and in numberless cases has proliferated into unserviceable and costly lines of print.

The book is printed on paper which seems durable and good. The binding is attractive and strong, and the book opens beautifully with pages staying flat. If the countless lines of type we have saved in the paragraphs above cannot now help reduce production costs, we venture to hope, even so, that the paper jacket at least is not responsible for the last 50¢ of the price of *Hortus Third*. This covering is singularly lacking in attractiveness, and the flowering spray introduced, as in desperation, to add a plant motif looks convincingly like poison sumac and seems without charitable application here. I believe Dr. Bailey would have selected something else.

As Dr. David Bates, Director of the Hortorium, notes in his preface, a work of this scope has required the talents of a great many specialists to assemble and organize the vast amount of material. The list of authorities is itself impressive. Much credit and appreciation go to everyone who had a part in *Hortus Third*, and not the least to those who prepared the drafts of the very complicated manuscript. The editors should be given a modern equivalent of the Linnean laurel wreath, and it is felt that circlets of palm leaves would be appropriate for all the Hortorium staff. ❧

RECENT BOOKS WORTH NOTING

In the Library of the Brooklyn Botanic Garden

(Please order directly from your bookstore, not from the Botanic Garden)

Garden Planning and Practices

The Home Gardener's Guide to Trees and Shrubs by John Burton Brimer. Hawthorn Books, New York. \$14.95

Different types are noted for different uses, and the author takes a fairly extensive look at their care. The advice on selection is unusually sound.

Lawn Keeping by Robert W. Schery. Prentice-Hall, Englewood Cliffs, N.J. Hard cover \$12.95, soft cover \$5.95

Concise, down-to-earth, authoritative advice is given by one of America's leading students of turf. The different types of grasses are confusing to the layman, but the author brings us nicely up to date on varieties.

How to Build Fences, Gates and Walls by Stanley Schuler. Macmillan Publishing Co., New York. \$13.50

Good fences may make good neighbors but sometimes the former are harder to make. This well illustrated book suggests many kinds of attractive, sturdy barriers.

Winterize Your Yard and Garden by George Taloumis. J. B. Lippincott Co., Philadelphia and New York \$9.95.

The so-called green thumb is dependent a good deal on brown-thumb and glove work, often beginning with proper preparation the previous autumn. This often neglected subject receives close scrutiny by a seasoned garden columnist and photographer.

How to Plan Your Own Home Landscape by Nelva M. Weber. Bobbs-Merrill, Indianapolis/New York. \$11.95

Good garden design books are a rarity these days, so the practical suggestions given by this experienced architect are especially welcome. The fine photographs by Molly Adams are idea-sparkers.

Plant Groups

Trees and Man by Herbert L. Edlin. Columbia University Press, New York. \$25.00

A stimulating overview of the world's forests and their unique character by a British scientist who presents many fascinating facts in a lucid, readable manner. It will appeal to backyard dendrologists who want more information than garden books can give.

The New Vegetable & Fruit Garden Book by R. Milton Carleton. Henry Regnery Co., Chicago. Soft cover, \$5.95

Many books have appeared on this subject lately, and this is one of the best researched. The differences between varieties of a particular vegetable receive special due, and there are also innovative cooking notes. A section for modern homesteaders is included.

Fern Growers Manual by Barbara Joe Hoshizaki. Alfred A. Knopf, New York. \$15.00

Although a bit more technical than most such accounts, this will be appreciated by gardeners with a serious interest in growing these plants. It is a fine complement to B.B.G. Honorary Curator F. Gordon Foster's *Ferns to Know and Grow*, a second revised edition of which was published in 1976 (soft cover, \$4.95) by Hawthorn Books, New York.

Gardening with Perennials Month by Month by Joseph Hudak. Quadrangle. The N.Y. Times Book Co., New York. \$12.50

An experienced landscape architect takes time out to compile a comprehensive list with brief descriptive and cultural notes. The format should be a help in planning plant combinations.

Wildflower Perennials for Your Garden by Bebe Miles. Hawthorn Books, New York. \$10.95

The greater part of the book is a discussion of 100 native plants, primarily of the East, and their culture. There is a chapter on propagation and transplanting, plus charming drawings by H. Peter Loewer.

B.B.G. APRON NOW AVAILABLE BY MAIL



We've always called soil by its right name, soil, but when it gets on your clothes it's just plain dirt. The B.B.G. is coming to the rescue with an apron made of sturdy blue denim with a Brooklyn Botanic Garden emblem in white. Four handy pockets make it possible to hold pruning shears, trowels, pencils and other paraphernalia. It's great for those little repotting or weeding tasks around the home and garden. The daring and debonair may choose to wear it over evening clothes when planting out annuals before the June ball; the pragmatic for cleaning out the garage. Some people even don it for kitchen chores, presumably to honor the first pot of asparagus or squash of the season. The price is \$3.75 plus \$1.10 postage. Available by mail from the Garden Shop, B.B.G., 1000 Washington Ave., Brooklyn, N. Y. 11225 (New York residents please add appropriate tax). ♣

Brenda Weisman

A Heritage of Herbs by Bertha P. Repert. Stackpole Books, Harrisburg, Pa. \$8.95

America has a herbal history also, and this warm, good-natured account provides delightful tidbits as well as plant notes and recipes. There is a chapter on different herb gardens around the country.

Carnivorous Plants of the United States and Canada by Donald E. Schnell. John F. Blain, Publisher, Winston-Salem, North Carolina. \$19.95

Venus flytrap is one of them, but there are many other less known species that the author describes. The book provides a botanical background that should make the culture of these oft-misunderstood plants more rewarding. Color plates, too.

Indoors

The Miracle Houseplants by Virginie F. and George A. Elbert. Crown Publishers, New York. Clothbound \$9.95, paperbound \$6.95

The subject is gesneriads, a very diverse and satisfying group of plants that lend themselves especially to indoor-light gardens, a subject in which the authors are keenly interested. One of their best books.

The Treasury of Houseplants by Rob Herwig and Margot Schubert. Macmillan Publishing Co., New York. \$12.95

Most overseas gardening books, even indoor ones, have limitations for American growers. Although this is of Dutch origin and includes some plants not available here, it is better done than most of its breed and has fine color photographs.

Six Ways to Grow Houseplants by Muriel Orans. A. B. Morse Co., Barrington, Illinois. Paperback \$3.95

A broad range is touched upon, including light gardening, hydroponics, terrariums and greenhouses. The list of top plant performers is interesting and well illustrated in color.

The Complete Book of Houseplants & Indoor Gardening, consultant editor Edwin M. Steffek. Crown Publishers, New York. \$16.95

Another lavishly illustrated volume, an import, from a publisher noted for its color work. The extensive text has been adapted for American readers by the former editor of *Horticulture Magazine*.

Regional

Rocky Mountain Dye Plants by Anne Bliss. Johnson Publishing Co., Boulder, Colorado. Soft cover \$6.00

Wildflowers of the Southeastern United States by Wilbur H. Duncan. University of Georgia Press, Athens, 1975. \$12.00

Native and Near Native by Albert Hostek. Environmental Centers of Setauket-Smithtown, Box 88, East Setauket, New York. Soft cover \$2.50

Ferns of Florida by Olga Lakela and Robert W. Long. Banyan Books, Miami, Florida. \$10.00

A Field Guide to Pacific States Wildflowers by Theodore F. Niehaus and Charles L. Ripper. Houghton Mifflin Co., Boston. \$10.95

Encyclopedia

Hortus Third by the staff of the Bailey Hortorium, Cornell University. Macmillan Co., New York. \$99.50

See page 54 for a full-length assessment of this important new tome. ♣



Anita Sabarese

A ROSE REJECTED

Alan D. Cook

Reprinted from DAWES ARBORETUM NEWSLETTER, December, 1976

The multiflora rose, once highly recommended by governmental agencies and nurseries for living fences and erosion control, has gradually fallen into disfavor because of its ready dispersal by birds. Many a farmer and homeowner has been plagued with thorny volunteers (in pastures and other grass areas) that tenaciously resist eradication and have potential dimensions

of 12 feet high by 12 feet wide. Ohio has had enough, apparently, since a recent law has made it illegal to plant *Rosa multiflora* in the state. Oddly, it seems nurseries can sell the once-esteemed-now-reviled species in Ohio. But the legislature is working on that. So the prickly pest will have to rely on natural proliferation in the future, which still may give it a long future. ❀

A SUMAC FOR LEAF TEXTURE

One of the commonest roadside shrubs in the eastern United States is staghorn sumac (*Rhus typhina*). Though its velvety deep red fruits are handsome and provide wildlife food, it is usually not planted in American gardens because of its lanky growth, coarse foliage, brittle wood and coppice-forming nature. A traveler is more apt to see it in European gardens, where flaming orange and scarlet autumn colors are rare in the native flora—and hence more valued. The densely furry twigs add a tactile interest in winter.

In recent years a variant, the cut-leaf sumac (*R. t.* 'Laciniata'), has become fairly widely available in the nursery trade. From a distance it has the grace and refinement of a threadleaf Japanese maple and might be considered as a sub-

stitute for it on dry, rocky, exposed sites where the latter does not thrive, or in very cold parts of the country.

The cut-leaf sumac is best grown as a shrub with several stems since these are relatively short-lived and don't lend themselves well to tree form. Like the species from which it is derived, it is fast growing and will form a good-sized clump within two or three years of planting, so plenty of room must be allowed for proper development. The cut-leaf sumac can make a fine "transitional" shrub planted at the edge of a garden and woodland or other informal area. An occasional close mowing around the base is helpful in the removal of unwanted shoots. No harm is done if overgrown plants are cut to the ground. ❧



Philip B. Mullan

Cut-leaf staghorn sumac (left) and typical form (right), photographed at the Brooklyn Botanic garden. Plants were then about six years old.

NOVEL USES FOR BLACK PLASTIC

Black plastic has become an accepted if not very attractive mulch in vegetable gardens in the last ten years. Other applications sometimes overlooked include its use as a weed killer in garden trouble spots where the application of herbicides may be impractical. For example, a New York City gardener with a little terrace and backyard had a problem some years ago because one end of his garden was a tangle of Japanese-bamboo (*Polygonum cuspidatum*), the roots of which penetrate almost to the center of the earth and are next to impossible to eradicate by hoe or spade.

Solution: he put down black plastic, covered it with a couple of inches of pine-bark chips for appearance, and set redwood planters on top to display annuals. It took nearly three years to kill the polygonum because the stoloniferous roots escaped near the edges of the plastic mulch and new shoots had to be periodically nipped. (They can be cooked and eaten as a poor man's asparagus.) The task was accomplished with little effort thanks to the black plastic.

A New England gardener with a taste for natural landscaping has discovered another use. At the edge of his lawn there is a stone wall, six feet beyond which is a parallel drainage ditch. Because the area between the wall and ditch was too hard to mow, all sorts of unwanted seedling trees crept into this no man's land and made it unsightly. Annual cutting by hand was laborious. Also, herbicides didn't seem wise to use because a small flower border was on the lawn side of the wall and fumes from the spray might have damaged desirable plants.

Solution: the gardener cut to the ground all the vegetation in the unmanageable strip, spread black plastic, and put a thin layer of pine needles (easily gathered nearby) on top for rustic good looks. He still has to rogue an occasional seedling that has taken root in the duff but can spend several extra hours in the hammock on a warm summer day—with a good conscience.

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Gottschö-Schleisner

The Cranford Rose Garden at the Brooklyn Botanic Garden celebrates its fiftieth anniversary in June. It is America's third largest rose garden in terms of varieties grown. For more information about plans to mark this special occasion, see page 35.

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